The Builder.

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*The Archæology of Rome.**

EVER and anon, in the course of the last few years, the archæological world has received items of intelligence from Rome relating to discoveries arising out of explorations and excavations made to ascertain the structural features of the Eternal City in its youth—the days of Romulus and Remus, of Coriolanus, Cato, Pompey, Cæsar, Antony and Cleopatra, Horace, Cicero, and other popular heroes and heroines. Apart from the results of the systematic investigations of the Italian Government, and those instituted by Napoleon III., the most interesting of these scraps of old-world news have been short notices of the progress of the researches of Mr. J. H. Parker, keeper of the Ashmolean Museum. Eight years have elapsed since the first word reached us of his intention to explore the remains of ancient Rome. In this interval he has made a sufficient accumulation of facts to fill two volumes, which he has just dedicated to Mr. Gladstone, and which scholars will find of considerable attraction.

We would not have it inferred that the facts classified by Mr. Parker are all new. On the contrary, his investigations have resulted more in a yield of evidence in favour of the general truth of the testimonies of ancient writers, than in new discoveries. For instance, he finds that Dionysius was literally correct when he said that each block of stone was a load for a cart, for each block of tufa is of a ton weight. The chief merit of his labours in Rome consists in the conscientious reproduction, by photographs, of every ancient fragment of importance. Dark, gloomy, and often dank as is the masonry in question, it has a radiance arising from associations as potent as sunshine, which sets it apart from any other. With this length of *opus quadratum*, we may fancy the eyes of the Sabine women were familiar; upon this *opus reticulatum* glanced Caractacus, as he marched past it, on his humiliating entry into Rome; or against this *opus Lateritium* the robe of Lucretia may have swept; and so on through almost endless conjectural reminiscences. One of the present volumes relates to the primitive fortifications, the walls and gates, and their historical construction; the second consists of photographs of these remains with short descriptions attached to each illustration. Both are but instalments, probably, of a larger work, but Mr. Parker has, he tells us, purposely, made each section complete in itself, so that if unable to carry out his original idea, some one else may proceed with his undertaking easily, on the plan he has commenced. Fresh information is given in successive appendices, with somewhat puzzling profusion. One chapter has four appendices.

Almost the first step taken by Mr. Parker resulted in the discovery of the foundation of the principal southern gate of the City of the Kings. He divided Rome into districts, in accordance with the regiones of the Regionary Catalogue of the fourth century, and began with the first on the list, the Porta Capena. The site of this gate was unknown; and as nothing could be satisfactorily made out until this was ascertained, Mr. Parker commenced his researches by a quest for it. He relates that he obtained permission to dig, after considerable delay, and by following the line of the aqueducts over the valley, between the Cœlian and Aventine hills, came upon it in the exact spot where he thought it must be. This early success gave him confidence, besides the clue he required. Further on he heard of a vaulted chamber at the bottom of a well at the corner of the Circus Maximus, and on descending into it, found that it corresponded exactly with the accounts left of the Lupercal of Augustus; and in a cellar he subsequently found what he believes to be part of the great prison of the kings. He then explored a set of subterranean chambers below the great building on the southern slope of the Capitoline Hill, and made them out to be the Ærarium, or treasury. On another occasion, when out with his photographer for the purpose of selecting a good view of the mouth of the Cloaca Maxima, he discovered, low down among the brushwood, three stone corbels projecting from the bank of the river, above the remains of Pons Sublicius, which were carved into lions' heads, about 3 ft. square, and from the holes in them, had evidently been used for the fastening of chains and ropes when the port was in use, as those on our own Thames Embankment are intended to be; and assisted by the excavations of Signor Rosa, he traced out three lengths of the earliest wall in Rome, or that which inclosed the space mentioned by Tacitus as the Roma Quadrata. But the chief bearing of his researches, as we have hinted, is a general confirmation of the truthfulness of the particulars given by Livy in his first book, and by Dionysius, and of the allusions made by Varro, Vitruvius, and Plutarch. This, perhaps, is as pleasant a result as he could have gathered in the eyes of the classic scholar.

Throughout Mr. Parker refers to Jerusalem and other contemporary cities, for corresponding features and explanations. Thus, the early walls of Rome are found to be of precisely the same character as those of Alba Longa, whence the original settlers upon the Palatine are supposed to have come, and both are found to be provided with a remarkable reservoir of rainwater. Outside the walls of Rome was a *pomœrium*, or orchard in the trenches. This feature, Mr. Parker points out, is frequently mentioned in the Bible as usual in the earliest times; and he quotes Deuteronomy, to show there was a special enactment for the preservation of fruit-trees in this position:—"When thou shalt besiege a city a long time, in making war against it to take it, thou shalt not destroy the fruit-trees thereof, by forcing an axe against them; for thou mayest eat of them, and thou shalt not cut them down (for the tree of the field is man's life) to employ them in the siege."

The Roman Pomœrium is treated of at considerable length. The original meaning of the word was lost in the days of Aulus Gellius, who thought it must have been derived from *post-marum*—the tracts or slips of ground immediately behind the outer wall, which, as they could not be built upon, were utilised as a garden. By the time of the Empire the word *pomœrium* was used to signify the boundary of the jurisdiction of the city. Only those rulers who had made conquests abroad could extend this boundary, which extension was looked upon as a religious privilege, and was attended by special rites. Vopiscus tells us that it was not permitted to an emperor to add to the *pomœrium* unless he had enriched the state by wresting some portion of territory from the barbarian. Following this clue, Mr. Parker goes over the ground very carefully from *cippus* to *cippus*, and makes out the successive extensions in a precise manner. Some of the *cippi*, or boundary stones, now found, have inscriptions, which are given.

In an appendix to his chapter on the primitive fortifications, Mr. Parker has collected several interesting facts and comments upon the ancient streets and roads. The streets were originally all made in the trenches of the fortifications, and the roads, when not also in the same situation, were closely connected with them. Strabo, it will be remembered, speaks of the roads, aqueducts, and drains, as among the wonders of the world. To understand the connexion between the roads and fortifications, we must call to mind that each of the famous hills was, at first, a separate fortified village, combined into one city by the later kings by the construction of short *aggeres*, or banks of earth, across the valleys between them. In the trenches left by the formation of these banks there was a road, as a matter of course. In counting over their number, Mr. Parker concludes there would have been one round each of the separate hill fortresses, and one on both sides of each of the connecting *aggeres*. These fossways eventually became streets in the time of the Republic and of the Empire, by the erection of houses along the banks. In 1870 four young Roman princes made an excavation near the railway station, and found that the backs of the houses thus built were actually constructed in the bank. The houses they uncovered belonged to a street thus made in the first century of the Christian era. Like all the streets constructed in the trenches of ancient Rome, it was about 20 ft. below the level of the surrounding ground; but the explorations were given up before the width of it was ascertained. Over some of these ancient pavements, 20 ft. below the surface, there have been uncovered second pavements about 10 ft. higher than these, bearing testimony to the truth of the record that new streets were made in Rome in the second century of the Christian era. The old streets were only about three yards wide, and there were frequently steps up the banks from them. Mr. Parker continues,—"To each of the hills, also, there was a zigzag road, like that now in daily use up to the Pincian. These have been altered into straight streets, with a steep slope at various periods; some of them only in the sixteenth century, under Sixtus V., who made many new streets in Rome, especially the principal street, called the Corso, or racecourse, because the races of horses without riders are held there in the carnival, and the long straight street from S. Maria Maggiore to the Pincian, called by different names." This alteration of some of the old zigzag streets into straight ones has left very insecure foundations for buildings. When the Scottish College was rebuilt, in 1866, the builders had to go down through 40 ft. of artificial soil before they came to a solid foundation, at which level there was an old pavement. No carriages were allowed to be used in the old hollowed out streets. Ladies rode on horseback, or were carried in litters to the gates, where their carriages awaited them.

The section on the construction of the walls to which we have on other occasions referred, is also full of minute particulars. Mr. Parker thinks it easier to read off the date of a Roman building by a glance at its masonry than it is to tell the age of a Mediæval structure by its ashlar work, because the distinctions are much more marked. He holds, we note, the old mistaken opinion that the date of an English building can only be determined by its mouldings; but there are no mouldings to the earliest Roman buildings, therefore the masonry itself must be perused. As the early Romans used the quarries nearest to hand, their buildings are composed of

* The Archæology of Rome. By John Henry Parker, C.B. Oxford: James Parker & Co. London: John Murray. 1874.

blocks of the local *tufa* laid without mortar. After the conquest of Alba Longa, Lapis Albanus, or *peperino*, from the Alban Hills, was brought into Rome and used for building purposes. As another century passed by, the quarries at Gabii were laid under contribution for *sperone*. Four centuries later the limestone, called *travertine*, was brought in or floated down on rafts from Tivoli in large quantities; and, later still, marble was imported from greater distances. "Independently of these building materials, which it is not always easy to distinguish at first sight," Mr. Parker owns, "the construction itself is a sufficient guide, and we can see the difference when it has been once pointed out, between the wide vertical joints of the early period, into which a cane can be thrust, and the closely-fitted joints and well-cut stone of the second period, and the iron clamps, or the holes from which they have fallen, in the third period." The author believes his is the first work in which these differences, together with those of the reticulated work of the empire, have been treated with any attention. But in this particular, he makes rather too large a claim. He is the first author, however, who has illustrated the several kinds of masonry so copiously with photographs. In Roman masonry, the larger the blocks the greater its antiquity. This is the case, too, with regard to the stone-work of Jerusalem. But the rule does not apply to Mediæval work; for Norman masonry consists of stones of smaller dimensions than those employed by the Plantagenets and Tudors.

Concrete buildings are no novelty. The earliest example seen in Rome is a lofty wall on the Palatine Hill by the side of the wall of Romulus. The beams of wood have perished that were inserted along the face of it at intervals, but the concrete is still as firm as the hill itself. Since this specimen of the material has proved to be so durable, it is a matter of moment to ascertain the exact process used in its manufacture. Mr. Parker attributes its durability to the facts that the necessary lime was burnt on the spot and used quite fresh; and that the Romans combined with their lime the rough and gritty Pozzolana sand and broken bricks.

We must not pass over altogether without mention an appendix contributed, chiefly, by Mr. Vaux, of Baliol College, on brick-stamps. The products of the potter's art frequently determine the date of a building by their inscriptions. The earliest known example bears the name of Augustus; but the bulk range from the commencement of the second century to the time of Alexander Severus A.D. 223. Mr. Vaux has ascertained that the inscriptions record the name of the consul or consuls of the year in which the brick was stamped, or its own title, or that of the manufacturer, or that of the estate whence the clay was obtained. The marks are generally circular, either in one line or two, running round a central ornament, such as a flower, or animal, or head helmeted; but they are also occasionally oblong. Curiously, the Ashmolean Museum possesses several examples.

Mr. R. P. Pullan contributes a chapter on the details of Roman architecture, in which he remarks that in Rome, as in other cities, at all ages of the world, the purest architecture flourished under the best government. From this point of view he describes the principal remains photographed. We recommend Mr. Parker's work to antiquaries and professional students if not with unquestioning confidence, at least with great praise.

We have reason to know that Mr. Parker has spent large sums in his Roman researches, and it is to be hoped that the public will not let him be a large loser.

PICTURESQUE LABOUR AND MACHINERY.

THE precise position at any particular time of the working, or labouring classes, as they are commonly termed, must of necessity be interesting to architects, and to all who employ, however indirectly, working men. This is interesting, as we say, at all times, but at the present moment it is more especially so, not on account of any particular or important "strike," or dispute, but on the broad ground of the *change*, the organic change, that would seem to be now going on in the condition of one particular section of labour: and this the more so from its influence on other portions necessarily consequent on such change in this particular one. We allude to the organic change that is taking place in the condition of the agricultural *labourer*, as he is termed, or the agricultural working-man. A few thoughts have occurred to us which may interest a thoughtful reader here and there. It has a bearing, too, on bricks and mortar, and perhaps *fine art*, and is worth at any rate a little cogitation.

It would be curious to note, according to date and place, one after the other, the various degrees of estimation in which the "husbandman," or tiller of the ground, has been held. He is, perhaps, above most others an historic man,—nay, he is yet older than history itself. In the most remote ages we may hear mention made of him, and his praises, and the dignity and importance of his occupation dwelt on in glowing terms.

In the oldest of human records the first man born into the world was a tiller of the ground; and in the most refined, and polished, and artistic of nations, the Greek, cultivation of the earth was an occupation not disdained by the most illustrious of men. How needless to cite instances, for so many are they that to hint at them is almost enough to bewilder the keenest memory with the crowd of images which the bare suggestion calls up. Whole volumes of sweet poetry have come into existence written to the music of the pastoral reed, from the earliest of days down to the present hour. We say, and must repeat, the *present* hour, for things are indeed about to change in this department of human doings which bid fair to remove the "husbandman" at least from the range and ken of poetic efforts. The useful, and the practical, and the getting the most out of everything by the shortest and cheapest of methods, is overriding all things, and the word-skill of the poet himself, however keen it may be, must needs fail at last, not from want of power, but from inaccessibility of subject.

The old-fashioned husbandman, or tiller of the soil, the ploughman, the sower of the seed, and the reaper, all so picturesque, and so full of country life and attractiveness, have as it is more than one half of them disappeared, we are told statistically, and in but a few years' time they will and must totally *disappear*, and make way for the "ploughing engine" driven by steam, the sowing-engine, and the reaping-machine. Six thousand reaping-machines made in one single year by one firm, to do the work of *sixty thousand* men. Sixty thousand husbandmen and picturesque tillers of the soil turned to other vocations by the practical and unpaintable, and not to be described, except in a *specification*—"reaping-machine." In twelve days only (it has been accurately calculated) 80,000 reapers may do the work practically and well of no fewer than 800,000 poetic-looking husbandmen. All know well of the use made of the ploughman, and the sower, and reaper, by the clever sculptors and wood-carvers of the old Gothic days. The Dark-Age cathedrals and churches, here and everywhere, are full of them, and a right good and interesting collection might be readily made of these stone and carved wood representations of the agricultural life of the Gothic ages; and not a little light thrown on the forms of the rude implements of the husbandman as then in use. The sculptor could hardly go wrong. The rude machine seemed almost made for the sculptor's use, and the man and the machine seemed made to fit each other, and designed almost to be copied in stone or wood. We are never tired of looking at them, and speculating on their *artistic* way of work. But *compare* such things with such terrific-looking engines and masses of machinery as the modern and most approved "ploughing engine." What shall the sculptor or the painter do with it? How mould it into artistic shape? It would seem to be a veritable impossibility to work into a picture a complicated and ponderous mass of new and improved machinery. The rude and rough old "enginery" seemed to fall into picturesque forms of themselves, almost as though they had been designed specially for such artistic purposes. Rough and huge wheels, and ponderous cranks, and huge supporting gear transferred themselves readily to the stone and wood, and became without any inventive effort picturesque and sculpturesque, and "architecturesque." But what can we say of the modern clean-made and delicate and perfectly-moving improved and perfected machinery, all of bright clean metal, and all so accurately fitted together and so polished? To *paint* it is impossible, and to carve it almost as much so. It is really not a little curious to look into an old worm-eaten book with representations of the old machinery for whatever purpose it may have been made;—all agricultural implements of the roughest and rudest, but yet, by the bye, effective, lifting apparatus used in building operations,—effective as we know by what they have done,—and a host of other strange things all obsolete in this improved mechanical age and country, but wonder-working indeed in their own distant day. There are but few things more singular than this of the old-fashioned mechanical appliances of past days,—see but the work it did, the masses it moved, and helped to mould into form and artistic shape!

But there is another and a more practical view to be taken of this phase of human labour, and it is perhaps yet more curious than that we have been commenting on and wondering at. It is the surprising change that is taking place in the condition and prospects of the husbandman or countryman through the power of machinery. Machinery and enginery are, to say plain truth, putting away the poetic husbandman: he is no longer required; the steam-engine, the ploughing-machine, the sewing-machine, and the reaper are gone into the fields, and are driving him out of it. There is really but little now to do but to look on and see how the all-conquering machinery does its clean and quick and effective work. One man can nowadays with a machine, and by dint of but little else than looking on, do the work of multitudes, and apparently rejoice in the feat, the multitudes having more to eat in consequence. The small field is despised, the mighty machine demands a larger and a larger sweep of work; and, what must needs grieve the artistic mind, it rides over all picturesque hedgerows, and fairly "levels" everything. It seems a pity this, the destruction of hedgerows, and quaint and picture-making corners; but what is to be done? The times, and the machine, and extending population, and education, and fate itself will have it so. It can hardly be expected that all these influences shall stop and cease to act for the mere sake of furnishing to the picturesque tourist, and to the Gainsborough of the hour, a something to look at, and to love, and to sentimentalise over, and to talk about, and to *paint!* What is the loss and gain here may exercise the ingenuity of the curious.

And thus are the picturesque husbandman, and tiller of the soil disappearing from human ken; but this is not all by a long way, for not only is the all-powerful machine driving him out of the green fields, and doing his work for him, but he is, strange to say, running away fast from the fields himself. All sorts of vocations, so we are assured, are calling out for him, and enticing him from his rural life and belongings to the cities and towns, and to the work done in them and about them. Mines, manufactories, building in the metropolis, and in large towns, and even watering-places are demanding his help, so that the tiller of the earth, like the earth itself, is the real source which supplies the world with what it needs primarily. Out of the earth all things come. And thus is the country supplying the town with its needful quantity, if not quality, of labour; and thus leaving the poor earth itself to the tender mercies of the insensible machine,—the machine, *per se*, with the human element of labour or work at a minimum, if there can be said to be any human work at all in it. We have said nothing, as being may be a little out of place, of that great coming "exodus of labour" which is to be soon inaugurated, and which promises to provide in distant lands an El Dorado of plenty for the favoured husbandman. But why, looking to facts, provided so kindly for him only? The cottager truly may at times need help, even in the most favoured localities; but there are cottagers, and plenty of them, in great London, in Liverpool, and in all other great towns we ever saw, and *their* inmates are to the full,—does Mr. Arch know it?—quite as helpless as ever their country cousins can be. Nothing can well surpass the interior of a town cottage. This is, indeed, an architectural and building subject, and not a little important; for nothing can surpass the evil arrangements and surroundings of a London cottage and its inmates, and this may bring us to another strange result of this change in the condition and doings of the primitive husbandman or countryman. It is the probable effect on the labourer in towns, and the consequent change even in *his* prospects. The British labourer, it would seem, has a capital prospect before him if he will but be content to stay at home and bide his chance. The ground

is clearing for him day by day, intelligence is spreading, and the clever workman, whether of town or country bringing-up, is pretty certain of occupation; so that for the mere hewers of wood and drawers of water there is a plenty to do, and ample room to do it in. Their prospects are improving, and competition is not so keen, or, at any rate, will not be so in the future. All this, we are confidently assured, is so; and it is not a little curious to think of the causes which have brought all this about. Labour, mere labour, is the simplest and commonest of all human vocations. The labourer is always ready at call, and his simple work is soon learnt, whether in town or country, whether in a ditch, or in helping to build up or to pull down a house. A strange enough fate is the "labourer's." He fits into all positions, from high poetry to the merest commonplace. If the painter wants a picturesque figure anywhere, why, the labourer is always ready for him, properly clothed in picturesque diversity of costume both in shape and colour. If but a crowd be required in the dim background, how could it be made up without the groups of working men,—labourers always, somehow or other, to be found everywhere hanging idly about? Practically, not poetically, what is the poor labourer to do when the mighty "machine" has totally run him down? He must cultivate *himself*, and become a professional man: learn to look after machines,—perhaps invent them. Well, thus we all go on advancing. Thus it has been, and thus it will be.

SIR EDWIN LANDSEER FROM FIRST TO LAST.

THE Royal Academy deserve every acknowledgment for giving all the room they could, and rooms they have that one of the busiest of the brotherhood,—once,—and one of the most to be honoured,—ever (for what he did he did perfectly well) should show his share of work again in the temporary home he has left for good. Those who are very much in love with life this side of the turf might beseech for so many more years of it as will pass before God's creatures whose language is in their eyes,—who act as they mean,—find such another advocate to represent them, to plead for them or defend them, as Edwin Landseer did; for if the prayer were granted it would set at rest all doubt as to whether man's or woman's age could be centenarian or not. Snyders, Rubens, and Velasquez notwithstanding, he was the greatest painter of what he painted that the world has yet seen.

The world grows bigger every day, and graves should make earth nearer to heaven by every hillock that tells of dust returned to dust.

Let every one go to Burlington House to see these pictures—the works of the late Sir Edwin Landseer. If the benefit to be derived from the visit were confined to the impression of what one man's work in his given days may amount to, the usefulness of such example would be worth a fortune to those who could follow it.

The curse of labour has descended—from long ago—more in reverse than reversion, for the curse of idleness now is the heaviest, if not the most bitter to be borne. Sweat of body or brow is salve for any trouble, and to labour is to pray, as we have been told over and over again. Strong health and a big business, with rather more of it than it is possible to do, give a very firm basis for a whole pile of happiness. It must be a question if the criminal convict finds his hardest time in hardest work, though it be his penalty; the scarcely less pitiable wretch—the man who labours honestly with no result but failure,—must find some fascination in hard work, or he would not wait until dazed brain and skin for his bones' dressing gave him testimonial for poor-law relief.

We have often done wrong by omitting to do right, or writing, sometimes: sins of omission weigh down sins of commission in the scales of justice, or should do so. What we might have said a week ago would be stale now, for with little variation all must think alike of Landseer.

Abroad, "Sir Landseer's" name is a household word. Foreigners, who look upon fog as deadly inimical to any growth of æsthetic matters, recognise in "Sir Landseer" an exception to their general rule of ignoring our belongings—our painters.

But the world is full of animals, and the Creator created man the last of all; for woman is but an adaptation. (You should remember this, Miss Albion; for to hear your talk, one would think that woman was formerly, as now, the first thing to be thought about in all creation, when she was nothing of the sort). Men and women are very like dogs and ducks, fierce lions and fawns; and Pythagoras may have been right, after all.

"Only an animal painter!" Were Titian and Joshua Reynolds anything more?

There never could be more stupid wrong done than when it is said Landseer ministered to a taste: he evoked the taste. It is nearly as reasonable to say that Æsop wrote natural history, or to take it for granted that Diogenes was, a vintner, maltster, or took in washing, by reason of his analogous affinity to a tub; as to enclose Landseer's claim of recognition as teacher with the mere truism that he painted only lions and lambs. Eagles and birds in a long list tell even the most ignorant, that he took higher flight than this, though a sparrow, if it but gave a text, was not too small a theme for him. Again, that he so humanised the brutes as to lose their distinctiveness from the superior beings, when it may be that there really is less to lose than the more conceited of the superiors could be made to believe.

It is given for the reward of few to whom "the night cometh when no man can work," that his life's labour should remain visible, lovely, and ever admirable for ages after that which brought "night" for the last time.

It is not in the number of his productions that this glory is assured to Landseer (for had he painted but half this number the results would be even more certain), but in the unerring directness of their appeal; the marvellous enunciation of their purport that never fails to be at once apprehended by the least and the most learned alike; and the exquisite and inimitable method of painting which seems to be the only right and proper one, because it vitalizes more than any other the particular representation to which it is applied—of the wearers of wool and fur and feather and hairy hide.

No doubt the popularity of animal portraiture is mainly attributable to Sir Edwin's excellence, but it remains to be proved if he have not left it a more difficult path to success than ever it was before; for he was as singularly foremost in his speciality as Charles Dickens was, is, and will remain as a writer, and, in some degree, "only an animal painter," too.

There is evidence enough to show amongst the great array of pictures, and more in the splendid national possession of Sir Edwin Landseer's works (what a strong supplement these would have been to the memorial at Burlington House), that he sacrificed a right to be considered a colourist to his first wish and desire to be widely known.

To what extent the engravings by Samuel Cousins, of his comparatively early productions, may have influenced him, may be guessed by the wonderfully improved effect the black-and-white versions of "Bolton Abbey in the Olden Time" and "The Return from Hawking" present when compared with the pictures; but to assert that the painter of such fixed images of the warm glow of life to be seen in the great painter's portrait of his father (241); or the charmingly brilliant Swiss picture "Refreshment" (215); or of the sketch for the fresco of "Comus," in the South Kensington Museum, was no colourist, is to say a funny thing; although it cannot be denied that this sense of colour has been relegated in favour of giving help to the inevitable translator—the burin.

There are but two things in the world that defy description: the cessation of sensation by death is one, and what positive constituents go to the formation of "genius" leave genius the other; for its possessor must be indescribably unlike anybody else to be accounted a genius at all.

"Immense capability of monstrous exertion," is one definition, and "gigantic result of no effort to speak of," is another.

The schoolboy's fudge of a similarly posing question is the best definition of all: "I know it, sir, I know it! I can't exactly describe what it is; *but I know it when I see it!*"

Nature and kindly fortune convened most of the essential elements for making the great artist of Sir Edwin Landseer; it is as difficult to perceive where or how his education commenced—at least, from any of the earliest specimens of his workmanship exhibited here,—as it is easy to decide when his heart was or was not in his work, throughout the great assemblage of these varying pictures: best always when Nature's help is most gratefully shown; worst, sometimes, when kindly Fortune's turn comes to be thanked.

One of the most puzzling of puzzles that beset a pilgrim to the goal of this life's maze is, "when to be grateful, and, what for?"

MESSRS. CASSELL & CO.'S NEW BUILDINGS.

WHEN the London, Chatham, and Dover Railway Company entered upon the works for their Holborn Viaduct extension, they took possession, amongst other property, of a number of narrow lanes, and upwards of a hundred houses of an inferior class, lying between the Old Bailey and the neighbourhood of the rear of Farringdon-street. Upon a portion of the site the extension railway has been carried in the direction of Holborn by arches, whilst upon that part of it extending from Messrs. Cassell, Petter, & Galpin's premises, in Belle Sauvage-yard, to Fleet-lane, large and extensive new buildings are in course of erection as an addition to their establishment. The new buildings, which are of considerable magnitude and extent, will occupy a ground area of upwards of 25,000 square feet, or nearly three-quarters of an acre. The memorial stone of the intended new buildings was laid last week, with some ceremony, by Mr. Cassell and Mr. Petter, when representatives belonging to several departments of the establishment were present.

The necessary excavations and works for the foundations alone have been unusually heavy, and have occupied upwards of twelve months, during which about 20,000 cubic yards of earthwork have been removed. Several interesting antiquarian discoveries were made during the progress of the works. In the course of the excavations the bed of the old Fleet ditch was reached, and on it were found the remnants of several old boats, whilst in other portions old coins were met with; but the most interesting discovery was a sarcophagus hewn out of the solid stone, in which were the skull and other portions of a skeleton, believed to be that of a man from its great length. The sarcophagus and its contents were taken to the City Museum, where they are now deposited. The extreme depth of the excavations from the street level of the Old Bailey to the sub-basement ground-floor is 40 ft., and the estimated cost of this portion of the works alone is 5,000*l*. The basement of the building from the street level to the floor is 18 ft. 6 in., whilst below this there is again a sub-basement 10 ft. in depth, in which will be placed the engines, boilers, and general steam power belonging to the works, whilst the machinery will occupy the basement.

The principal elevation of the building will be in Fleet-lane, to which it will have a frontage of 227 ft. in length and 70 ft. in height to the eaves. It will consist of the ground-floor and four stories above, in addition to dormers in the roof. In the centre there will be a lofty tower, carried to a height of 150 ft., and the new building will be connected with the existing premises, which, when the works now in progress are completed, will cover a ground area of nearly two acres in extent. The ground-floor portion of the elevation will be in Portland stone, carried up in piers, the upper portion of the building being of white Suffolk brick, with Portland-stone dressings; Portland-stone piers being also carried up to the top of the building. Above the third story there will be a massive cornice, formed partly of Portland stone and partly of brick, and ornamented in terra cotta. The capitals of the piers will also be in terra-cotta; whilst under the window-sills of the different stories there will be panels likewise in terra-cotta. The windows of the two lower stories will have segment heads, and the third-story windows circular heads; the arches of all the windows in the different stories being turned and faced in coloured marble.

Internally, the ground-floor will be supported by strong cast-iron columns, five tons each in weight, resting upon stone blocks in the basement, three tons each in weight. From the columns will spring wrought-iron girders carried across the entire area of the floor, the columns and the girders supporting rolled iron joists, upon which a fire-proof floor will be laid. The upper floors will be similarly supported by iron columns carried one above another to the top of the building, together with iron girders and joists, diminishing in their weight and dimensions at each successive floor.

At the north-east angle there will be an annexe, the ground-floor of which will be for the

workmen's entrance. This portion of the building will be carried up to the full height of the main elevation already noticed, the whole of the stories above the ground-floor being completely fire-proof, and exclusively set apart for the steel, copper, wood, and other blocks used in the production of illustrated works.

The architect is Mr. Francis Chambers, of Bow-lane, and the contractors for the foundations are Messrs. Elkington. Mr. J. R. Wilson superintends the works as the architect's representative, and Mr. Brodie is the clerk of works. The contract for the erection of the superstructure has not yet been entered into, but this will be finally decided in the course of the ensuing week.

THE LANDS CLAUSES ACT.

INSTITUTION OF SURVEYORS.

AN ordinary general meeting of the members was held on the 5th instant, the president (Mr. E. N. Clifton) in the chair, when a paper was read by Mr. Philbrick, Q.C., on "The Lands Clauses Consolidation Act, with some suggestions for their amendment."

In the course of the paper Mr. Philbrick said that the Lands Clauses Consolidation Act, 1845, with the amended Acts of 1860 and 1869, presented them with a tolerably complete code of law on the subject. It was formerly held that no subject could be compelled to part with his property; but as the wealth of a country increased and the masses increased, the wants of the community became greater; and hence it was necessary for Parliament to grant compulsory powers for the taking of land for building, railway, and other purposes. The earliest Act of this character was the "New River Act" of 1605, which was for the purpose of bringing a free stream of running water to the northern part of London. The necessities arising for the making of streets, roadways, docks, and other works of an important public nature, specifics for these objects were sought for and obtained through Parliament; and these applications had been of late years very numerous, especially towards the latter part of the last century. The Lands Clauses Act was pretty general in its provisions. The power of purchase by agreement was expressly limited to those lands which were authorised to be taken. The taking of land involved the purchase, though the purchase of that land must involve damage or injury to the former owner of the land, who required compensation. The Act had to deal with these various branches, but it was desirable to keep them apart, for they had to consider positive law, or law laid down by enactment; and obviously, therefore, they should know exactly what they intended to effect, so as to be clearly understood, and to devise proper machinery to the results desired to be attained. The principles of compensation ought to be laid down. The purchase of the real estate involved, amongst other things, (1) parties able and competent to contract; (2) and the price agreed upon. With regard to the fixing of the price, there were lands of such value that it was impossible to fix a price so as to tempt the owner; but the law was a fixed principle in all cases, though it should be borne in mind that hard cases made bad laws. With regard to the statute of 1845, he objected to the careless manner in which the Legislature had framed the Act, giving rise as it did to many contentions.

Speaking of the question of arbitrations, he thought that it was a useless formality for an arbitrator to make a declaration before proceeding to make an award. The question, too, of the taxation of costs involved many difficulties, which, he trusted, would be taken into account, causing, as it did, great inconvenience. But when the different clauses were framed, they were not so well understood as they were at present. He would suggest the amendment of the 47th section of the Act, which referred to the jury proceedings. He would also advocate the creation of a court, which should be presided over by judges, and subject to a High Court of Appeal, which court should be charged with the duty of all things arising out of the Lands Clauses Consolidation Act; the funds would, he thought, be easily obtainable by all the claimants paying a certain percentage towards it, which money, he was of opinion, would be well spent, and would effect a great saving.

In conclusion, he said that the Act had now been in operation for many years, and under it property to the value of millions had changed hands under compensation for damages; and he trusted that while venturing to suggest some amendments of the Act, the main principle of it would receive the consideration which their practical utility and good work demanded.

Mr. Clark briefly proposed a vote of thanks to the reader of the paper.

Mr. Ryde, in seconding the proposition, said that with regard to the amendment of the Lands Clauses Act two important suggestions had been made by Mr. Philbrick. In the first place, he advocated that the law should be amended so as to give the opportunity of first contesting the right of the land to compensation before proceeding to the amount of compensation. To any such view he (the speaker) would have the greatest objection; and whether in the interest of companies or not, nothing should be done to increase the hardship upon the claimant. If the law were amended it would give to the company not prepared to pay the money opportunity for delay which some companies would be certain to avail themselves of. This was one question on which the judgment of the Institution might be serviceable. The other important alteration was that there should be a court of appeal. It was very desirable that mistakes of all kinds should be corrected; but were there, after all, many mistakes made? They must not cavil much at the judgment; and, taking a broad view, when the companies took a proper course were there any mistakes made, and did many companies pay on the whole very much more than they ought to pay? The great objection would be that more litigation than was necessary would consequently take place; and a company, not liking a decision, would appeal against it, and the matter would go on till all the money would be spent in litigation. One of the clauses of the amended Act of 1869, which dealt with the question of costs, did nobody any good, he thought, and injured companies more than anybody else. Arbitrators considered, according to this clause, that their clients would have to pay the costs of the action if they did not recover from the company, and so the objectionable clause was bad in principle, and was a miserable failure, and it urgently required amendment.

Mr. Philbrick explained that it was never his intention to suggest that any alteration of the system should be effected when once the amount of compensation was fixed; but as to the errors of principle he intended his remarks to apply.

On the motion of Mr. Ryde the further discussion was adjourned till the 19th inst.

THE HOLBORN MEMORIAL OF THE PRINCE CONSORT.

ACCORDING to the daily papers, the equestrian statue of the late Prince Consort, for some time under canvas, and of which we gave a view and description in our last volume,* was uncovered on the 9th inst., his Royal Highness the Prince of Wales graciously assisting. We may repeat from the official description that the Prince is represented in the dress of a Field Marshal, and in the act of returning a salute. The pedestal is slightly under 15 ft. high, in granite, and composed of stones weighing from 2 to 10 tons each; the base is in light Shap; the whole of the upper portion (with the exception of the rock on which the horse stands) is in Ross of Mull granite, highly polished, and is placed on a concrete foundation of considerable depth. In the sides of the pedestal are two bassi-relievi; the one represents the first public act of his Royal Highness within the City—viz., the Prince laying the first stone of the Royal Exchange, 1842; the other represents Britannia distributing awards to the successful competitors in the Exhibition of All Nations, 1851. At each end of the pedestal is a figure; the one, "Peace," holds in her right hand a cornucopia, and in her left a palm-branch; the other, "History," is recording events of the Prince's life in a book. The sculptor of the whole work is Mr. Charles Bacon, who, in the design for the pedestal had the advice of Mr. P. C. Hardwick, and the work has been executed under the general superintendence of Mr. William Haywood, the engineer of the Holborn Valley Improvements. The bronze castings are by Messrs. Young & Co., of Pimlico; the granite work is by Mr. D. D. Fenning; and the monument has been erected by Messrs. Field, Poole, & Sons, of Westminster.

The position of the statue is not altogether a happy one. The committee point out as amongst the advantages of the site that the statue can be seen from Holborn for a distance of 500 yards, but unfortunately what is seen for the greater part of these 500 yards, the back of the group, is neither edifying nor agreeable. In sentiment the position may be said to be correct; but it seems to us that the effect as regards the great majority of the persons who pass it would have been much better if the group had been placed across the road instead of facing the viaduct and backing upon Holborn.

* See vol. xxxi., p. 827.

BUILDING CONTRIVANCES AND MATERIALS AT THE INTERNATIONAL EXHIBITION.

A MEETING of the sub-committee for architecture, building contrivances, and materials, was held at Gore Lodge, on Wednesday, the 14th inst., when there were present (Mr. Godwin, F.R.S., in the chair), Col. Wray, R.E.; Mr. T. Roger Smith, Mr. Elger, Mr. Kirkaldy, Mr. Grant, and Mr. Bird. Capt. Clayton, R.E., acted as secretary. The chief business was the consideration of a scheme of experiments on building materials in large sizes and spans. It includes 232 experiments on wood beams, rolled iron joists, stone steps, posts of wood, granite and stone columns, granite and stone cubes, bricks, brick piers, and cements. On the motion of the chairman, seconded by Mr. T. R. Smith, the following resolutions were agreed to *nem. con.*:—1. That this committee consider it desirable steps should be taken to obtain the means for carrying out the scheme of experiments submitted by Mr. Kirkaldy at a cost not exceeding 500*l.*; and 2. That the commissioners be recommended to apply to the Royal Institute of British Architects, the Institution of Civil Engineers, and the Society of Arts, to learn if those bodies are disposed to assist with funds the object in view.

We sincerely hope that they may be found willing to do so: the work proposed could not fail to prove of great public value.

There are about 120 applicants for space in this section, and the foreign exhibitors have yet to be added.

THE ROYAL INSTITUTE OF BRITISH ARCHITECTS.

SANITARY ASPECTS OF HOUSE CONSTRUCTION.

AN ordinary general meeting of the session was held last Monday evening, the chair being taken by Sir Gilbert Scott, who attended for the first time since his election to the Presidency, having just returned from Italy, where he has been staying for some time for the benefit of his health.. Messrs. T. Naden and R. L. Hesketh were elected members.

The secretary, Mr. Charles L. Eastlake, read a letter from Mr. Ewan Christian, calling the attention of the meeting to the threatened destruction of Ely Chapel, Holborn, which, he stated, was to be publicly sold by auction; and urging upon the meeting the necessity and importance of taking some steps in the matter.*

The President stated that Ely Chapel was an interesting building of the year 1295, and though robbed of much of its decoration it was really an admirable architectural work. Professor Kerr said that representations to the auctioneers should be made with all respect; and he would move a resolution to the effect that a committee be appointed to call upon them to see what could be done in the matter. The motion was seconded by Mr. Charles Barry and unanimously carried.

Captain Douglas Galton, C.B., then read a paper "on the Sanitary Aspects of House Construction."

Mr. T. H. Wyatt, in proposing a vote of thanks, said that Captain Galton was an authority on the subject of which he had treated, and they ought to be very grateful to him for engendering that strong feeling in connexion with sanitary science which should animate all of them. But there were difficulties in this matter to be carried out which were known only to architects.

Professor Kerr said that with regard to the responsibilities of architects in reference to sanitary matters, sanitarians would improve them off the face of the earth; the fact of the supposed neglect of architects in this respect

* We have received several letters on this subject. Surely some arrangement can be made to preserve the ancient structure.—ED.

did not lie with them, but with others. At the same time they were all sufficiently interested in the matter to appreciate, in some degree, the excellence of Captain Galton's paper. He (the speaker) thought that it was the first paper he had heard which had exhaustively set forth the whole practical question which was now before the public. It seemed to him that there was one matter which the expert sanitarian might occupy himself with, and that was to take up houses as they were and see what could be done, without placing insurmountable obstacles in the way of their improvement. If an architect ventured to ventilate a building he was generally stopped in his work, and thus architects had great difficulties to contend with.

Mr. Wyatt hoped that the room in which they were then sitting, which was very well known to be badly ventilated, would be attended to.

Mr. Charles Barry said that Captain Galton had told them that he had advanced no new theories, but had dealt with facts which no one than he could deal with more successfully. He was in the envied position of being able to lay down principles without having the responsibility of having them carried out in the face of the difficulties which surrounded architects, who had no choice of locality, and extenuating circumstances might be very well urged for them. The ventilating arrangement for drawing-rooms in ordinary houses, as they all knew, unfortunately failed; and it was very difficult, in fact all but impossible, under existing arrangements to properly ventilate a dwelling, the difficulties to contend with being so great. Relative to the stove which bore Captain Galton's name, he (the speaker) said that all those gentlemen who had examined it were unanimously agreed as to its efficiency for the objects for which it was arranged. There was, however, one point which he would like further information upon, and that was as regards the solving of the question of the curing of smoky chimneys by the adoption of the Galton stove.

Mr. W. White, speaking of the proposed new Sanitary Bill, said that the difficulties of sanitary science in this Bill would, he understood, be thrown entirely upon the local medical officer; and he could only hope that the medical officer would prove as efficient as Capt. Galton. At the present time there was a very great difficulty and objection regarding the ventilation of houses; and he would then take occasion to remark upon the room of the Royal Institute of British Architects, which had been so long stagnant in its airs, and not very fresh, and he trusted that the matter would be attended to.

Mr. Woodthorpe said that he had attended that evening for the express purpose of protesting against the ill-ventilation of the room they were at present sitting in. Many architects would not attend the meetings of the Institute in consequence of this. It was an offensive room, and as a sample of architecture, a disgrace to them as a body; and he thought that something should be done to give them a comfortable and wholesome room.

Mr. Rawlinson said that the question had been asked as to what might be done to remedy existing defects in sanitary matters. This was an important question, and he himself thought that it was the question of acquiring knowledge as soon as possible to answer these ends. With regard to London, the system of drainage was more perfect than in any other city, but the sewers were not as they might be; and a house in London, with drainage, was just about as bad as it could be. Very frequently the basement was underlaid with drains, which were often on a pervious subsoil running from back to front. Now, such an arrangement as that was of the worst possible kind which could be devised for the drainage of a house. The drains should be rendered air and water tight, and be buried in concrete, and so constructed that no air from them should be admitted in the building. With regard to ventilation, their rooms were made for domestic uses, and there was the difficulty, when a large number of people were together, of good ventilation, which, if not carried out, caused an incalculable amount of mischief. Under existing arrangements, it was impossible to construct modern houses so that equal comfort could be given to the family and to the visitors at the same time. The staircase should be the lungs of every house. He had exposed himself to some ridicule by certain observations which he had made as regarded the sanitary conditions of houses, but these he himself had practically carried out. In the first place, he had removed every drain from the basement, and both sewers and drains he had ventilated, as well as the public sewer. In modern houses there was no ventilation for the higher parts, and no arrangements were made for freeing upper stories of warmed air and effluvium which ascended, the result being that the upper stories were unwholesome and unhealthy. Speaking of the ill-ventilation of the Institute, he said that the question regarding its unwholesome state he brought before the meeting no less than six years ago, and during that time they had been suffering from the ill effects of the present arrangements without attempting any remedy.

The President, in putting the vote of thanks, regretted that he was incapacitated from adding any remarks upon the interesting subject which had been brought before them, as he was still suffering from the effects of his late illness. He would, however, make one remark, in addition to the many remarks which had been made, and that was to speak of the value of the paper which had been read.

SILICA.

On the 2nd of January a paper was read, before the Geologists' Association, by Mr. Hawkins Johnson, F.G.S., on "The Nature and Formation of Flints and allied Bodies." The object of the paper is to show the nature of several members of a large group of bodies occurring in sedimentary deposits of different ages, and which are generally known as nodules, and described as concretionary. Those specially alluded to are the Septaria from the London and Kimmeridge clays, the flints from the chalk, the iron pyrites from the chalk, the phosphatic nodules of the Gault, the clay ironstone nodules of the carboniferous series, and the ironstone from the Woolwich beds. By the gentle action of solvents the structure of these bodies is revealed, so as to be easily examined by the microscope. They are then found all to agree in possessing a silicified organic structure, which may be described as a network of fibres, or a mass permeated in every direction by anastomosing canals. This structure was subsequently filled in with other material, such as carbonate of lime, silica, bisulphide of iron, phosphate of lime, carbonate of iron, &c.; the particular substance thus filled in depending upon the relative abundance of the substances dissolved in the interstitial water of the surrounding matrix. The singular groups of concentric, silicious, circular bands seen upon many fossils, and known as Orbicular Silica, or Beekite markings, are also explained. The fossils on which they occur were imbedded in a matrix more porous than themselves, and of irregular constitution, so that the evaporation, to which the consolidation of the dissolved silica in their pores was mainly due, occurred at a number of points on the surface of the fossils, at which points a deposit of silica took place, forming the central tubercles. The cessation of evaporation was followed by a fresh saturation with the solution, to be again evaporated as before. But, as the evaporating points were now plugged up by the previous deposits, the silica last consolidated was deposited around their margins, and upon them internally, appearing outwardly as a ring round the tubercle.

ARCHITECTURAL ASSOCIATION.

IRON CONSTRUCTION.

An ordinary general meeting was held on the 9th inst., Mr. Quilter, vice-president, in the chair, when the following gentlemen were elected members:—Messrs. A. A. Ranson, R. A. Boyd, J. B. Hocombe, H. M. Mavor, and G. W. Gael. It was stated that the Saturday afternoon visits would commence on the 17th inst., and that an announcement would appear in the *Builder* as to what building would be visited.

The Chairman said that most of the members would remember that, last year, a fund was instituted, in the form of prizes, to encourage students in architectural drawings, several gentlemen liberally contributing towards it. This year it has again been established, and Mr. Reed had generously given twenty guineas towards this object. Professor Lewis, too, had again contributed 5*l*. He would have much pleasure in proposing a vote of thanks to these gentlemen. Mr. J. Douglass Mathews, in seconding the proposition, said that five prizes had been founded, and the idea was not to give members an immense deal of work, but rather for them to produce thoughtful drawings.

The resolution was then carried.

The Chairman intimated that that day month the members' *soirée* would take place, and he trusted that, by its means, greater geniality would be established among the members.

Mr. Paice then read a letter from the secretary of the Architects' Benevolent Society, acknowledging the donation of 7*l*. 5*s*. from the Association.

Mr. Mathews moved the following resolution:—"That a fund be established to receive small donations from members towards the Architects' Benevolent Society, and that a donation of 5*l*. be contributed from the funds of the Association to head the list."

Mr. Blashill seconded the resolution, and it was unanimously carried.

Mr. Richard Moreland, C.E., then read a paper on "Iron Construction." In the course of his remarks, he said, with regard to cast-iron pillars in long columns, the transverse section had two duties to perform, viz., to support the load, and to resist flexure, so that only one half of the strength of the pillar could be considered available for the resistance to crushing, and the other half for the resistance to flexure. In other words, one half was in compression, and the other half in tension; and this was precisely the condition in which a girder was, or it might be taken as a question of leverage; the length of one end being the diameter of the pillar, and the other the half length of the column; but in the case where the pillar was large in comparison to its length, then the whole of the material must be taken to resist compression of a considerable portion of its crushing strength. The working load on pillars should not exceed one-tenth to one-sixth of the breaking load, and, under ordinary circumstances, should not exceed 25 diameters. Special care should be taken when the pillar was subject to transverse strains, where heavy goods of unstable form were piled against them, as a considerable strain must be produced from that cause; and also in the event of blows from rolling goods, or other causes. Pillars in juxta-position to brick walls, took the whole load when they were strong enough to bear it; but masonry served to stiffen the pillar if secured to it; but if the wall was built in cement, and of considerable thickness in comparison to the iron pillar, they then possibly must assist each other. In cases where the brickwork was liable to be compressed, and the pillar unequal to its load, then obviously nearly the whole weight must be discharged on the pillar; but care must be taken as possibly intense compression might take place at the base of the pillar. The basis should be as level as possible. Short columns under crushing force were deformed by pyramid wedges forming at the ends, and forcing out wedges at the sides. This was also seen in the crushing of stone and other solid materials. For various forms and sections of pillars, and also of different lengths, the strength of the material would vary considerably under the diverse conditions in which it was placed. For small proportions of length to diameter, cast-iron was the strongest material, but its strength diminished as the proportion of length to diameter increased faster than wrought iron; and in the comparison of solid square or wrought-iron pillars, with solid round cast-iron pillars beyond 26½ diameters, the wrought iron was the stronger. For ordinary work no cast-iron column should exceed 27 diameters in height. The elasticity of cast iron was twice as great as that of wrought iron. The strength of girders to resist resilience was proportional to the weight of the beam, irrespective of the length, so that a beam twice the weight or twice the length would take twice the load to produce the same deflection, as rolled girders were only economical up to a given size and weight. He then referred to the wrought-iron trussed girders placed over the dining-room at De Keyser's Royal Hotel, and said that in designing the outline of the ironwork of these beams, Mr. Greening, the architect of the building, had several objects in view. The thickness of the floors through which the structure was fixed should not be thicker than the other floors, and that generally the girders comprising the truss should be limited in depth so as not to interfere with the heights of the various rooms; the central space, too, should be quite open. The two side spaces being occupied with chimney-breasts and flues, economy of space and material, together with

great rigidity, were thereby attained. The construction of the six trusses might be briefly described. Two wrought-iron girders were taken for upper and lower members of the truss and distanced apart by two vertical girders, and so dividing the space into nearly three equal parts. From the junctions of the vertical girder with the upper girder to the ends of the lower girder another wrought-iron girder was placed at an angle and securely bolted and secured at the ends. Each of the long girders, independently of the truss construction, would be able only to support its own area of floor, say 1 cwt. to 1½ cwt. per foot; but by the employment of these girders as upper and lower members to the construction, these, by the addition of about the weight of one girder and a half, were made to support a load of ten times that which they would carry by themselves. The three lower girders were placed immediately above the dining-hall; the lower girder was only 10 in. deep, 12 in. wide; the upper girder was 16 in. deep, 12 in. wide; the length was 38 ft. 3 in.; and the span between walls 35 ft. 6 in.; and the whole height was 9 ft. 3 in. The distance between the vertical rods was 15 ft. 6 in., so that a space was given of 7 ft. 1 in. high by 15 ft. 6 in. wide. In the centre of the girders the diagonal trusses were of the same section as the lower girders. The sectional area of the lower girders and trusses was 46 square inches, and, deducting 8 in. for rivets, gave a net sectional area of 38 square inches. The upper girder had a gross section of 48 in., which was all available for compression. The foot of each diagonal was bolted to the lower girder, and an angle-casting was also secured to it and the lower girder; and similar castings were also fixed at the junction of the vertical girders with the upper end of the diagonals. Each separate piece of the truss was riveted together and laid in position, the corner castings fitted, and the whole of the holes drilled, after being carefully put together; and the various positions were then fixed in their respective positions and securely bolted together. The summary of load on the girder was 200½ tons.

FROM PARIS.

Marshal Bazaine's Hotel.—Despite the heavy costs to be defrayed by the prisoner of Sainte-Marguerite, Bazaine's Hôtel is not yet announced for sale. It is a simple construction, commenced in 1869, and finished after the war. It is situated in the Avenue d'Jena, and occupies about a hundred mètres of land. There are but two floors, surmounted by a sloping roof. Above the chief entrance is a terrace-room, 10 yards square; the left is the porter's lodge, and to the right a *perron* of three steps, giving access to the ground-floor. On this floor are situated the *salon*, dining-room, and study; on the first are another *salon*, and four bedrooms. There are at the back a coachhouse, and stables for four horses; but Bazaine, who has occupied the house more than six months, never brought his horses to Paris. The hôtel is built after the plan of M. Fevre, and cost 180,000 francs, the ground lease included. This sum has not yet been paid. 70,000 francs remain due to the Crédit Foncier, which, it is said, is about to seize the property, as the ex-marshal, deprived of his status as a citizen, cannot be prosecuted.

Sale of Public Property in Paris.—The Paris Municipal Council has been for many years an enthusiastic and influential political body, but, commercially speaking, it is a failure. There is more unproductive civic property in Paris than in any other capital of Europe. The Council avows itself unable to utilise these possessions, and is now proceeding to sell all lands and buildings that yield a revenue out of proportion to the price of purchase. But this operation is somewhat delicate and complex,—the Council has been taught prudence by a bitter and costly experience. Therefore, instead of selling as before at any price, the authorities intend to organise a vast system of exchange, which shall permit them to get rid of unproductive encumbrances, and at the same time enlarge and embellish the lands, squares, and buildings that yield a sufficient revenue. Negotiations have been opened with the different companies in possession of contracts for the piercing and widening of public thoroughfares, and it is through their instrumentality that the exchanges will be effected. The contractors succeed where the Council fails. This latter body was unable after three attempts to sell the site and *débris* of the Ministry of Finances, albeit it is situated in the centre of the fashionable quarter, and private houses adjoining it which were destroyed by the Commune have been since rebuilt and sold easily at profitable prices.

A School of Industrial Art.—Great things are expected from the administration of the new director of fine arts, M. de Chennevières, and his first innovation encourages the expectation. He is about to execute a plan conceived by him many years ago, and which provides for the establishment of a school of industrial art, which shall hold an intermediary position between the so-called industrial schools already existing in different parts of Paris, and the classic École de Beaux Arts. The former are known to be too mechanical, too purely industrial, to be of any use to the many professions that range from historic painting to turning and silversmith's work. M. de Chennevière's school is designed to become a veritable hot-house of practical artists, porcelain-painters, artistic photographers, wood-carvers, architectural ornamenters, &c. The designers for the manufacture of Gobelins, Beauvais, and Sèvres will be chosen from among the pupils of the new school, to which a novel branch will be added,—workshops for the artistic working of iron and stone.

BUILDING IMPROVEMENTS IN WALWORTH ROAD.

AN important improvement is now in progress on that part of the west side of Walworth-road, lying between Penrose-street and Amelia-street. A short distance from Penrose-street, in the direction of Manor-place, a large extent of property having its frontage to Walworth-road, and extending westward to the boundary-wall of the recently completed Newington vestry's stone and dust depot, has been entirely cleared away. The site upon which this property stood is upwards of three acres in extent. The whole of the houses which covered the site, including those facing the Walworth-road, were in an unusually dilapidated condition, whilst at the rear, behind the last-named thoroughfare, close and ill-ventilated courts abounded, containing hovels not fit for human habitation. The site as cleared has been newly laid out, and fronting the main road a number of substantial houses and shops are in course of erection, which will effect a great improvement in this portion of the thoroughfare. The buildings in question are of a rather ornamental character, the materials being yellow stock brick, with moulded and carved stone dressings. The windows above the ground-floor have arches of white, red, and black brick. Extending the entire length of the Walworth-road frontage an area which was enclosed within the former buildings has been thrown into the footpath, by which it will be materially widened, and rendered more convenient than heretofore for pedestrians. At the rear of the site dwellings of a superior class are also being erected containing improved sanitary arrangements. On a site a little further northwards, extending almost to the south side of Manor-place, and also on a third site between Manor-place and Amelia-street, similar blocks of new buildings, having their frontage to Walworth-road, are likewise in course of erection. The new houses and places of business in progress in the locality are altogether upwards of 150 in number.

BRANDON SURREY GARDENS ESTATE AND SCHOOL BOARD FOR LONDON.

A COMPENSATION case, of interest to those who have the management of large building estates, was decided on Monday last, by Mr. Under-Sheriff Abbott and a jury, having lasted two days.

The claim made and supported on behalf of the estate by several well-known surveyors amounted to from 3,500*l.* to 3,900*l.*, for about five-eighths of an acre of valuable freehold building land, taken compulsorily by the Board, including consequential damage to the remainder of this large estate, upon which it is proposed soon to erect 300 houses. There is, however, a subsisting lease of the Surrey Gardens for an unexpired term of eight years and a half.

Mr. Elioart and other surveyors, on the part of the Board, considered that there would be *no* damage to the estate by a Board school for 800 children, and 1,163*l.* and upwards the proper sum to be paid for the land.

The jury, after an hour's deliberation, awarded the trustees the sum of 2,400*l.*, being 1,650*l.* for land, and 750*l.* for damage to the estate.

It did not transpire why the Board selected a site affecting one or more of the few entrances to a large estate, and so involved themselves in the payment of a large sum for consequential damage.

Messrs. Lander & Bedells, the surveyors, and Messrs. Chinnock & Galsworthy, the auctioneers, of the Brandon estates, appeared on behalf of their clients, and both sides were represented by counsel.

SPEKE HALL, LANCASHIRE.

SPEKE HALL, a fine timbered mansion of the olden time, of which there are some good pictures, by Nash, in the South Kensington Museum, appears to mean Spike Hall.

The name occurs as Espic, Le Espeake, &c., in old documents, which I read as Spiney, *i.e.* Thorney Hall. A. H.

THE RAILWAY CLEARING HOUSE.

THE private Bills deposited, the powers indicated in which Parliament will be asked to sanction in the coming session, include "a Bill for enabling the Railway Clearing Committee to purchase Land by compulsion, and to build thereon for the purposes of the Clearing System," &c. The proposed enlargement of the already very extensive premises occupied by the Railway Clearing Committee, give occasion to inquire what work is done by this institution that it hath grown so great.

Before entering on this inquiry, it may be explained, concerning the draft Bill, that it sets forth in the preamble that the Clearing Committee, by their Act of 1850, acquired, for the purposes of the railway clearance system, an extensive building called the Railway Clearing-house, situated on the south-west side of Seymour-street, Euston-square, in the parish of St. Pancras; that the building is held in the name of Mr. Philip William Dawson, the secretary of the committee, in trust for them, for the residue of 74 years, from 1865, with a right of renewal for any term not exceeding 999 years. That the business of the Clearing-house has greatly increased, and is still largely increasing, and that it is necessary, for the convenient carrying on of the business, that additional building accommodation should be acquired in close proximity to the present Railway Clearing-house, which cannot be attained without the aid of Parliament. The piece of ground proposed to be appropriated for the enlargement of the Clearing-house is the plot immediately adjacent to the present building, and lying to the south-west of Seymour-street, and the north side of Bedford-street. It is also proposed by the Bill that the committee may from time to time borrow and re-borrow any sums not exceeding, in the whole, exclusive of money re-borrowed, the sum of 150,000*l.* The powers for the compulsory purchase or taking of lands, for the purposes of the Act, shall not be exercised after the expiration of three years from the passing of the Act. Powers are asked for in the Bill for the clearing committee to elect trustees in which the property shall be vested.

An idea exists in some minds that where there is a choice of railway routes between two given points the public have the benefit of competition. The idea is a delusion, as was brought out in the evidence given in last session of Parliament, before Mr. Chichester Fortescue's Joint Committee of Lords and Commons on railway amalgamation. The evidence of numerous chairmen of railway companies, general managers, and others intimately acquainted with railway affairs, brought the committee to the conclusion, stated in their report, that it may be taken as a general rule, that "there is now no active competition between different railway companies in the matter of rates and fares. Wherever different companies run between the same places they arrange their prices. For instance, not only do the London and North-Western, the Midland and the Great Western, make the same rates between Manchester and Southampton, but bind themselves by agreement not to make lower rates, so that one cannot lower its rates without the consent of the other two. And if a new railway should ever be started, with a promise of lower rates, it is sure, after a short time, to arrange with its original rivals a system of equal

charges." In answer to the Earl of Derby, a member of the committee referred to, Captain Tyler, R.E., Board of Trade Railway Inspector, stated his belief, having previously given evidence that led up to the conclusion, that "competition must, in the end, die a natural death." Combination of railway companies, however, is a more real thing than competition among them, and in the Railway Clearing-house they have a union, organisation, and instrumentality, that serves practically as the executive of a great "federation." But it is not, it should be admitted, a combination as against the public, but rather an agency that is essential to the transaction of railway business, as regards traffic in whichrtwo or more companies are concerned. The operations of the Clearing-house Committee and their staff are of advantage to the public as well as to the companies that are parties to the system, and it is not too much to say that the suspension of the functions of the Clearing-house authorities would bring the through traffic railway business of the United Kingdom to a dead lock in a single day.

The Clearing-house was established in 1842, the need for such an interposing and regulating authority being strongly felt even then, when the railway system was so much less extensive and complex than it is now. The original object of the clearing system was to settle the proportions of receipts arising from through traffic in which there was more than one company concerned. Ninety-and-nine of the principal railways of the United Kingdom are now committed to the Clearing-house authority, each company being entitled to send a delegate to represent it at the periodical conferences and special meetings. In 1850, the committee were granted another Act, by which they obtained powers to sue, and to be in the position of being liable to suit, in the matter of balances that they might declare against any company. The delegates meet quarterly, and, amongst other matters, decide the rates that are to be charged against one company for the use of the rolling stock of another, and the proportions of terminal charges. The Clearing-house officers trace the traffic for which they adjust the proportions of payments to the respective companies by their own men. This they effect mainly by having number-takers stationed at every junction where trains pass from one company's system to that of another. In illustration, if a ton of goods is sent from say Aberdeen to London, a return is sent to the Clearing-house from Aberdeen, giving the date of despatch, the number of the invoice in which the goods are charged, the weight, and the number of the wagon in which the goods are carried. A corresponding return is sent by the London station; if not corresponding, it is the duty of the Clearing-house officials to find out the cause of the discrepancy, and to bring the companies into agreement. In the case supposed, if the goods come by the East coast, the Caledonian Company would have the carriage to Perth, the North British Company to Berwick, the North Eastern Company to York, and the Great Northern Company to King's-cross. The clearing-house number-men take account of the transfer from one company to another at Perth, Berwick, and York. In such a journey special allowance is made for portions of the route that have involved extraordinary cost in construction. For the high-level bridge at Newcastle, for instance, which is a mile in length, three miles are allowed.

The duties discharged by the Clearing-house committee are of the most multifarious, complex, and onerous nature. While they are in a certain degree arbitrators between railway companies, they are also their responsible representatives. The Clearing-house committees really constitute a species of railway parliament. There is *the* clearing committee, and committees of general managers, of goods managers, of coaching superintendents, with arbitration committees on rolling-stock charges and goods traffic. The several committees pass, from time to time, important resolutions affecting the interests of companies and of the public. When these resolutions have been thoroughly canvassed, and the necessary preponderance of authority has pronounced in their favour, they are duly codified, and thereafter acted upon, individual companies having, however, in some instances, right of dissent. Among the important matters discussed and almost invariably settled by the Clearing-house authorities are various questions of fares, excess, through, return, season, tourist, &c. In rates they determine charges for goods, minerals, live-stock, parcels, newspapers, pontages, insurance premiums, "paid ons," goods sent in error, questions of running powers, alternative routes, terminal charges, special allowances, credit and bad debts, loss and damage of goods, over-charges and under-charges, charges for "smalls," for round timber, trans-ships, mileage and demurrage. The mileage and demurrage charges for rolling-stock on special service upon a "foreign" line (as all other lines except the company's own are called), is 10s. per day for a first-class, 7s. 6d. for a second, and 5s. for a third class carriage.

The Clearing-house regulations and classification of goods for rates appear to be quite exhaustive. In addition to the fares before referred to, the regulations prescribe those charged for family carriages, fares for military and naval officers and cadets, volunteer officers attending schools of instruction, soldiers, sailors of the Royal Navy, policemen, prisoners, shipwrecked mariners, volunteers, volunteer officers' grooms, bands of music with excursions, military bands,—to quadrille bands no concession is made,—boats' crews proceeding to regattas, who are charged a single fare for return-ticket, operatic and theatrical parties, boys intended for service in H.M. Navy, scholars and apprentices, season tickets, &c., and voters at Parliamentary elections. Members of the British Association, the Social Science Association, and the Institution of Mechanical Engineers, have "the privilege of obtaining, on the presentation of cards of membership, return-tickets at the usual fares," but no concession is made to religious societies or for attendance at scientific or political meetings. In cases where there is more than one company concerned in carrying to a particular station, no reduction in the fares can be made "without the concurrence of all the parties interested."

The regulations affecting goods traffic and the rates to be charged appear to be much more complex than those that apply to "coaching" or passenger traffic. In the classification of goods there are about 2,500 enumerated items, many of them rather curious. In this general classification, for instance, there are acids, almonds, aloes, anchors, anchovies, and arsenic; bagging, barilla, barm, barometers, bath-chairs, bird-cages, blacking, blubber, bones, bread, brooms, bullets, burr stones and buttons; cabbages, candied peel, cardamoms, carriages, cedar, cement, chalk, cheese, cigars, cinders, cinnamon, coal-dust, cockles, coffee, coffins, copper, corn, corozzo nuts, cow-heels, crabs, cranberries, crape, crow-bars, crucibles, and cutch; dates, deals, dripping, drapery, dried peas, and dye woods; earth-closets, ebony, elephants' teeth, engravings, and evergreens, "including mistletoe"; fang bolts, farina, feathers, figs, flax, and furs; gall nuts, game, garden-rollers, gas tar, ginger beer, glucose, gravel, goloshes, and grindstones; hammers, hats, hoes, hominy, hops, and hinges; ice, Indian corn, indiarubber, indigo, iron, and iodine; jams, jet, and jute; kelp, kettles, keys, and kamptulicon; lace, lampblack, lard, litharge, and lobsters; machinery, malt, meal, matches, molasses, mushrooms, and mustard; nets, needles, naves, and nuts; oakum, old clothes, onions, oranges, osiers, and oysters; packed manures, paints, pans, paper, pipes, pistols, pork, pozzolano, prawns, and putty; quicksilver and quills; rabbits, rags, raisins, rice, rosin, rotten stone, and rye; sacks, safes, sago, sand, scoria, shoes, shot, snuff, soot, spirits, sprats, sugar, and sulphur; talc, tar, tarlatans, telescopes, timber, tin, turtle, and turnips; umber and umbrellas; valonia, vases, vegetables, veneers, vermicelli, and verdigris; wadding, walking-sticks, wax, waste paper, whelks, wine, wire, and wood; xylomite, yarn, yeast, and yellow berries; zebrawood and zinc.

Iron and hardware are entered in the general classification, but they are also further minutely subdivided, iron into twenty-four items of undamageable, and sixteen items of damageable articles; castings into fourteen undamageable, and nineteen damageable; bridge work is divided into ten items, and the parts of iron roofing into as many. Hardware is divided into 120 articles, including amongst many others,—augers and awl blades; bells and beetle-traps; calipers, cinder-sifters, and coffin furniture; door-knockers and dust-pans; edge tools and eyelet-holes; files and frying-pans; gimblets and grid-irons; handcuffs and hooks and eyes; Italian irons, jacks, and Jews' harps; matchetts and mousetraps; nails and nut-crackers; pincers and pins; rat-traps and riddles; shoe-horns, skates, and spittoons; tacks and toasting-forks; warming-pans and weights, &c.

The voluminous regulations, instructions, tables, schedules, and forms, compiled for the guidance of the railway companies that are parties to the clearing system, convey some idea of the great number of contingencies that have to be provided for, and of the vexatious disputes and untoward circumstances that frequently occur, and that are fitted to tax severely both time and temper. Among questions referred to the Clearing-house for settlement are those of insurance of parcels, parcels addressed paid that are not paid, parcels refused, parcels left to be called for, damage of contents of parcels and packages, &c. Then there is a large number of matters and things carried by railway for which special rates have to be charged and special regulations laid down. Among the specials are German sausages, that are favoured by being charged half-parcels' rate; ice, that may not be sent in smaller quantity than 28 lb.; plants and flowers, that are conveyed to shows for a single rate; plate-glass, stereo casts, tobacco, pianofortes, each charged as for a private carriage if put upon a carriage-truck; sewing-machines, cartridges, percussion caps, petroleum, and other mineral oils; Bath-chairs, velocipedes, perambulators and bicycles, boats and canoes, carried at 2d. per mile, with a minimum rate of 5s.; vans, caravans, and steam roundabouts, 6d. per mile; bullion; horses, minimum rate, 5s., with special rates for race, stud, and hunting horses; hounds, carriages, tramway-cars; oxen, bulls, calves, sheep, pigs, and other small animals, except dogs. Corpses, the charge for an adult being 1s. per mile, and for a child, 6d., the minimum charges, 20s. and 10s. if a vehicle has to be attached to the train, or 10s. and 5s. if not. Special rates are also charged for live gold fish and live poultry. Poultry, if consigned to a dealer for consumption, are charged half-parcels' rates. Gunpowder, gun-cotton, cartridges, lucifer-matches, fusees and fog-signals, phosphorus cases, naphtha, naphthaline, petroleum, benzoline, and other mineral oils, are properly subject, as regards their carriage, to very stringent regulations. The vapour of the mineral oils carried must not be inflammable at a lower temperature than 100° Fahrenheit.

The services rendered by the Clearing-house to the companies, and to freighters, are very valuable and important, and such as could only be given by a central and neutral authority. The companies are guided by the Clearing-house as to the distinctive marks and numbers, for ready identification, that they put upon their ropes, chains, sheets, and wagons. The stripes in various parti-colours to be seen upon wagons, are transverse, oblique, at right angles, and otherwise disposed, and might seem to the uninitiated to be painters' vagaries, but they have all their use and meaning. One of the most useful tables published by the clearing-house gives the maximum dimensions of the carriages or wagons loaded, that they may travel safely over 110 lines of railway in various parts of the kingdom, that are duly enumerated, so that the loaders know, before it leaves the sending station, whether the wagon can pass to its destination.

An enormous number of accounts and returns are received daily at the Clearing-house, and are duly entered, docketed, and put away: the accounts are kept for seven years, and the station returns for four years, and are then destroyed. The accounts as between companies are settled at the Clearing-house monthly, except for horses, carriages, dogs, parcels, and newspapers, the balances for which are settled half-yearly. Payments on account in disputed cases are placed to a suspense account at the Clearing-house.

In last session of Parliament the representatives of this great confederation obtained an Act of Parliament that was much needed, and that is likely to prove of great utility, for securing superannuation allowances to railway officers. A number of large companies have already established such funds, but there are many companies that have not a sufficient number of officers to form a satisfactory fund. The Clearing-house superannuation fund extends its advantages to the officers of all companies, parties to the clearing system, who choose to contribute to it. The fund is formed on the same basis as those of the companies referred to, which vote amounts equal to the aggregate contributions of the members.

It is expected that the Railway Clearing Committees' Extension Bill of this session, like the one they introduced in the last, will pass unopposed.

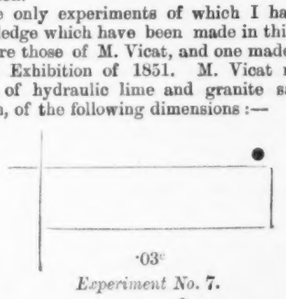
ON FIREPROOF BUILDING.*

THE ordinary construction, called fireproof, consists of brick arches carried on iron beams, which generally rest on iron columns for intermediate support, the end arches being tied by iron bars to prevent outburst of the walls; and what generally happens when a fire takes place is, that the columns become softened or split by a dash of cold water while they are very hot, or the under side of the girder—which is generally exposed to the greatest strains—is weakened by heat or split by suddenly cooling, or the tie-rods lose their tensile force; the floors fall in, the walls fall out; and the very process adopted for the preservation of the building greatly facilitates its total destruction. Of the two, a common timber floor, well sealed underneath, would have lasted longer, thereby giving more time for salvage, and could not, at the worst, have suffered more than the pseudo-fireproofing; but still something can and must be done to protect the ironwork, as by its means alone can the sort of structure which is required for the business be erected with the necessary stability.

In designing such a building, the architect should first ascertain the smallest area that he can be allowed to use as the unit of construction; he should subdivide by internal partition-walls as far as he will be allowed to do so; and, having thus arrived at the cubic spaces of which the intended building is to be composed, and finding that the spaces over which he has to carry his floors render it necessary to avail himself of the constructive facilities afforded by iron, he must set himself to work deliberately to contrive such a mode of using it as will protect the iron from the effects of fire. If columns are required for intermediate support, I think they might be of iron, of somewhat larger diameter than usual, and the interiors filled solidly with cement concrete, carefully packed and rammed, the idea being that the cement should form an interior column capable of sustaining the load in the event of the iron failing; or of +-shaped iron, with a coating of brick in cement; or, best of all, a simple shaft, with cap and base constructed of bricks laid in fine Portland cement, as nearly skin to skin as possible. These would be not very sightly; but that is of very slight importance when the enormous damage to be overcome is considered; but, as it is not worth while to make anything uglier than it need be, I should recommend a shaft square on plan, with edges chamfered, and stopped at top and bottom. This would have the appearance of a clumsy timber post; but a series of them would not look amiss. Then, as regards the floor itself, in which I include not the surface only, but the whole mass from floor to ceiling which separates the two stories,—what we have to do is to support an area, say 15 ft. or 20 ft. square, and at the same time present to the action of fire a surface, above and beneath, which shall be absolutely uninflammable, and which shall not be subject to any alteration of dimensions or strength by the action of fire,—not be destroyed by the action of wet. I believe these objects would all be attained as nearly as possible by the construction which I have sketched, which consists of a beam of rolled iron resting on a cushion of brickwork not less than 3 in. over the finished top of the pillar. When the beam is set it should be painted and well sanded all round; then a platform or centreing should be erected of the exact form of the intended under-surface of the ceiling when finished; over this tiles of any pattern that may be approved should be laid, face downwards, filling up the whole surface; the remaining space should be then filled in to the level necessary for laying the floor tiles with a concrete prepared of Portland cement, sharp silicious sand, and broken bricks and potsherds, or broken granite or sandstone, carefully excluding all calcareous stone, gravel, or sand. The upper surface should be properly levelled and floated, and a course of flooring tiles laid and grouted with cement in the ordinary way. The supports of the centreing should be suffered to remain as long as possible, and it would be advisable in all cases to finish each floor complete *pari passu* with the walls, letting the cement concrete which forms the floors rest solidly for some inches in and on the outer walls.

There are, I confess, doubtful, or rather unsettled, points about this construction, viz.—1st. The proportion of the load to be supported by the iron girders, and consequently what the proportions and sectional area should be. 2nd. The transverse strength of beams or slabs of cement concrete; no experiments that I have been able to find have yet been made to determine this. 3rd. Whether the tiles forming the under coating would not be detached by fire or water suddenly dashed against them when hot. I would wish to say a few words on each of these points. First, as to the basis of calculation of the load to be borne, or the amount of work to be done, by the iron. It will be observed that from the nature of cement concrete it differs from a floor formed either of beams and joists or of a brick arch, inasmuch as it resembles a slab of stone; and in that it is at one and the same time, both in load and self-supporting, within moderate dimensions, we can readily conceive a square slab of concrete to be independent of support except on two sides of it. And here comes in the second doubtful point. If we had the strength of a slab of concrete stone as well known as that of a slab of granite or limestone, we should know exactly that with a certain thickness we could use it with safety for a certain projection beyond the supporting wall. To take an example: no architect would venture to fix a landing of granite projecting 4 ft. 6 in. from the supporting wall, and 6 in. thick, or to cover a space 9 ft. between the walls by slabs of granite 6 in. thick; in either case it would be recognised that iron beams under the joints would have nothing to do—would be superfluous. We have not that experience as regards slabs of concrete; we do not know how far they are to be trusted; and therefore I recommend the employment of iron in conjunction.

The only experiments of which I have any knowledge which have been made in this direction are those of M. Vicat, and one made at the Great Exhibition of 1851. M. Vicat made a beam of hydraulic lime and granite sand, as sketch, of the following dimensions:—



·03

Experiment No. 7.

c. foot.
L 0·03 = ·098427

c. inch.
D 0·025 = ·98427

inch.
B 0·04 = 1·5748

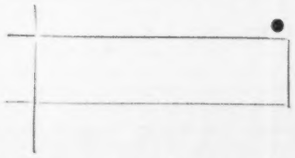
kil. cwt.
W 32·00 = ·62096

Experiment No. 8.

kil.
47·00 = ·92515

Applying the general formula $W = c\frac{ba^2}{L}$, we find the value of c to be, in No. 7, ·16 cwt., and in No. 8, ·235 cwt. These results are very low as compared with the value of c for other materials; as, for instance, 3 for Riga fir, 4 for red pine, 18 for cast-iron, &c. I cannot help thinking that the exceedingly small dimensions operated on were very unfavourable for an experiment of the kind on such a material.

The experiment made at the Great Exhibition of 1851 was somewhat similar. The beam was



of pure Portland cement, 14 in. long, 4 in. × 4 in., and it bore 1,580 lb. Adopting the same formula, this gives a value of 1·174 cwt. for c, or rather more than one-half the value for Riga fir. But as Portland cement loses its strength very materially by admixture with sand, we must reduce the constant very materially for this reduction; but, on the other hand, there is nothing easier or more natural than to increase the strength of the Portland beam by giving it a curved form underneath; and for the same reasons that we make a beam of iron of a parabolic form in order to collect the materials exactly into the place where they will produce the maximum of effect, so we should give the beam of Portland cement an arch form of the same shape underneath; and it is not improbable that this expedient would make up for the loss of strength caused by adding sand and gravel to the cement—or, in other words, of using concrete in place of pure cement.

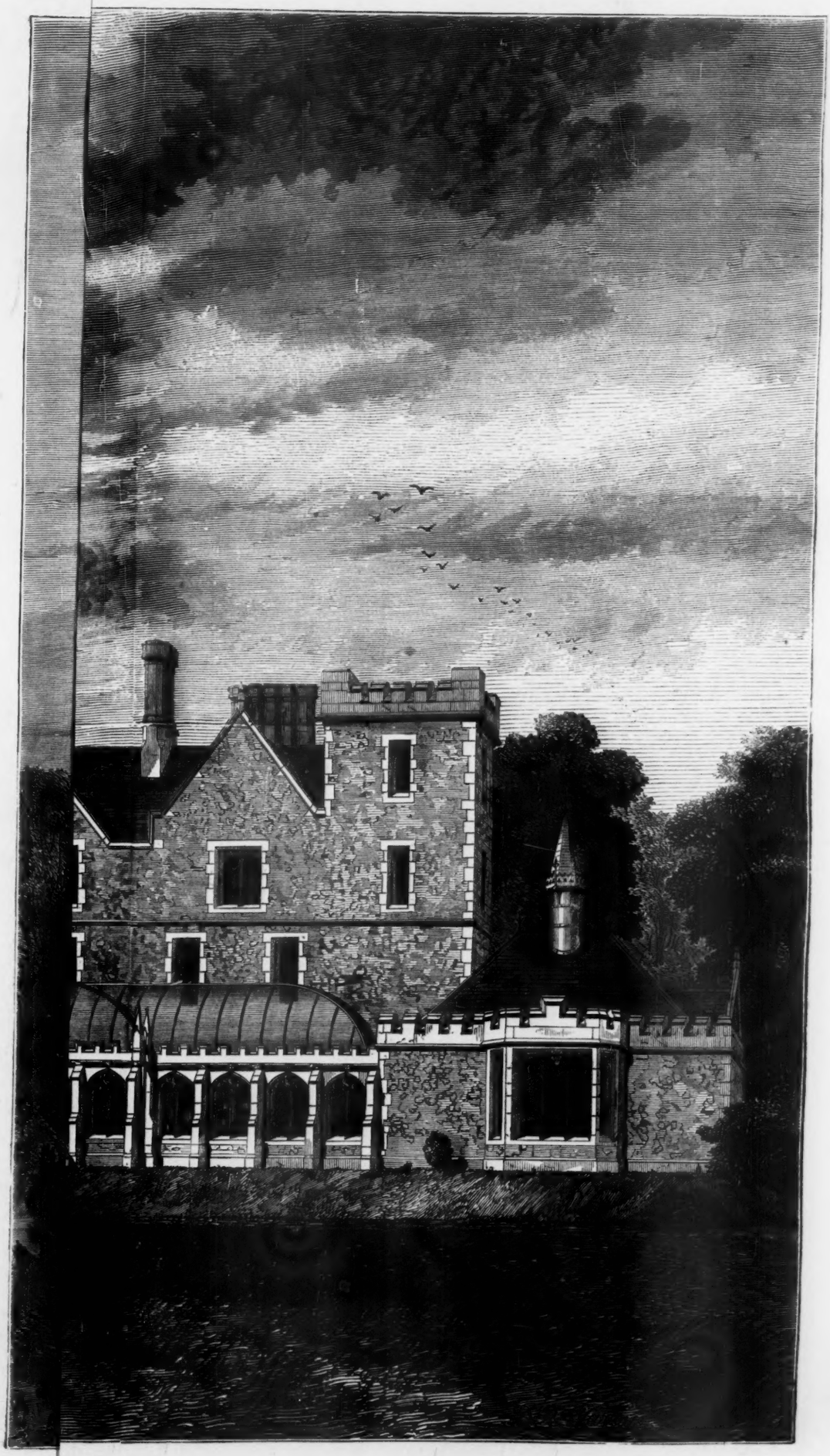
One other thing to be borne in mind is, that in all cases of using cement concrete for covering over spaces the value of B becomes extended. In an ordinary beam we have B only a few inches, and bearing the weight of an average of 10 ft. of floor. In the Exhibition experiment the weight amounted to nearly 4½ cwt. per foot superficial of floor; and as the exterior weight for warehouses and factories is only reckoned at 2½ cwt. per superficial foot there was evidently great excess of strength, considering the proportion of 4 in. of breadth to 10 ft.

I must not dwell longer on this subject, or you will fancy I can never get down from my hobby. I do hope, however, that those who have the opportunity will try really testing experiments on concrete in this sort of application, and publish them for the benefit of the profession. I feel rather confident that the result will be that floors and ceilings combined can be constructed of concrete, which shall rival any other form of material as regards price, strength, and economy of space.

I think it desirable to add a few words as to precaution which may be used in lessening the tendency to catch fire in buildings which are not in their nature actually non-inflammable or intended to be so. Whenever timbers are exposed, it is very desirable to cover them with a coating of common whitewash, which acts doubly as a preservative, both by excluding air from the timber, and from its non-conducting power. This will, of course, be of no use when a fire has once been kindled and got to a head; but in case of fire, seconds of delay in kindling it or communicating it are of vital importance. In many a workshop or factory, if the floors and roof timbers were kept well whitewashed the risk would be much diminished. Special precaution should be taken about the floors and fireplaces: there is frequently great carelessness in trimming joists and fixing grounds for skirting, &c. It would be very desirable always to skirt chimney-breasts in cement or plaster, and to fill in the place under the hearthstone with cement concrete. Ceilings, again, should be formed with much stronger laths and better nailed; and if about 2 in. of rough mortar, the coarser the better, were laid over the laths between the joists, it would be found very difficult to set fire to them—they would resist for a considerable time even a fierce fire underneath. Again, all rooms should have a good height, otherwise the constant operation of gas-lights is to prepare the timber of the ceilings for combustion on the most rapid scale, if the opportunity be once given. As regards all stoves, great attention should be paid to their being so arranged as to avoid all risk arising from the heat of the stove itself, its flue-pipe, or its ash-pan; no stove should be considered safe the flue-pipe of which cannot be heated to redness with perfect safety to the building. But in all ordinary buildings the most important point to attend to is the staircase: it should be, if circumstances will admit, closed at top or bottom, cut off from the passages leading into the rooms, and in the construction of it it is very desirable to lath the soffits with extra strong laths, and fill in from the upper side with concrete, so that all the space at the back of the riser and under the tread shall be a solid mass of non-inflammable material. Such a staircase would probably stand and bear the weight of persons ascending and descending under circumstances where an iron or stone staircase would be destroyed or useless.

* By Mr. James H. Owen, M.A. Read at a meeting of the Architectural Association of Ireland, December 18th, 1873. See p. 4, *ante*.

Dirty Colliery Owners.—Owing to the determined action taken by the London Board, the disgraceful state of the hovels tenanted by pitmen, in not being provided with water-closets, is at last to be remedied; and last week a number of colliery owners were ignominiously summoned before the Lanchester Bench, county Durham, for neglecting to find such places. The owners of the Lintz Colliery and others agreed to supply the accommodation, and the summonses were remanded, to learn if the promises be fulfilled, the owners having to pay the costs.



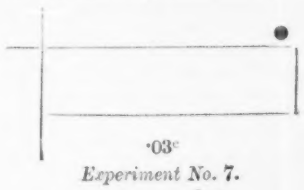
ON FIREFROOF BUILDING.*

THE ordinary construction, called fireproof, consists of brick arches carried on iron beams, which generally rest on iron columns for intermediate support, the end arches being tied by iron bars to prevent outburst of the walls; and what generally happens when a fire takes place is, that the columns become softened or split by a dash of cold water while they are very hot, or the under side of the girder—which is generally exposed to the greatest strains—is weakened by heat or split by suddenly cooling, or the tie-rods lose their tensile force; the floors fall in, the walls fall out; and the very process adopted for the preservation of the building greatly facilitates its total destruction. Of the two, a common timber floor, well sealed underneath, would have lasted longer, thereby giving more time for salvage, and could not, at the worst, have suffered more than the pseudo-fireproofing; but still something can and must be done to protect the ironwork, as by its means alone can the sort of structure which is required for the business be erected with the necessary stability.

In designing such a building, the architect should first ascertain the smallest area that he can be allowed to use as the unit of construction; he should subdivide by internal partition-walls as far as he will be allowed to do so; and, having thus arrived at the cubic spaces of which the intended building is to be composed, and finding that the spaces over which he has to carry his floors render it necessary to avail himself of the constructive facilities afforded by iron, he must set himself to work deliberately to contrive such a mode of using it as will protect the iron from the effects of fire. If columns are required for intermediate support, I think they might be of iron, of somewhat larger diameter than usual, and the interiors filled solidly with cement concrete, carefully packed and rammed, the idea being that the cement should form an interior column capable of sustaining the load in the event of the iron failing; or of +-shaped iron, with a coating of brick in cement; or, best of all, a simple shaft, with cap and base constructed of bricks laid in fine Portland cement, as nearly skin to skin as possible. These would be not very sightly; but that is of very slight importance when the enormous damage to be overcome is considered; but, as it is not worth while to make anything uglier than it need be, I should recommend a shaft square on plan, with edges chamfered, and stopped at top and bottom. This would have the appearance of a clumsy timber post; but a series of them would not look amiss. Then, as regards the floor itself, in which I include not the surface only, but the whole mass from floor to ceiling which separates the two stories,—what we have to do is to support an area, say 15 ft. or 20 ft. square, and at the same time present to the action of fire a surface, above and beneath, which shall be absolutely uninflammable, and which shall not be subject to any alteration of dimensions or strength by the action of fire,—not be destroyed by the action of wet. I believe these objects would all be attained as nearly as possible by the construction which I have sketched, which consists of a beam of rolled iron resting on a cushion of brickwork not less than 3 in. over the finished top of the pillar. When the beam is set it should be painted and well sanded all round; then a platform or centreing should be erected of the exact form of the intended under-surface of the ceiling when finished; over this tiles of any pattern that may be approved should be laid, face downwards, filling up the whole surface; the remaining space should be then filled in to the level necessary for laying the floor tiles with a concrete prepared of Portland cement, sharp silicious sand, and broken bricks and potsherds, or broken granite or sandstone, carefully excluding all calcareous stone, gravel, or sand. The upper surface should be properly levelled and floated, and a course of flooring tiles laid and grouted with cement in the ordinary way. The supports of the centreing should be suffered to remain as long as possible, and it would be advisable in all cases to finish each floor complete *pari passu* with the walls, letting the cement concrete which forms the floors rest solidly for some inches in and on the outer walls.

There are, I confess, doubtful, or rather unsettled, points about this construction, viz.—1st. The proportion of the load to be supported by the iron girders, and consequently what the proportions and sectional area should be. 2nd. The transverse strength of beams or slabs of cement concrete; no experiments that I have been able to find have yet been made to determine this. 3rd. Whether the tiles forming the under coating would not be detached by fire or water suddenly dashed against them when hot. I would wish to say a few words on each of these points. First, as to the basis of calculation of the load to be borne, or the amount of work to be done, by the iron. It will be observed that from the nature of cement concrete it differs from a floor formed either of beams and joists or of a brick arch, inasmuch as it resembles a slab of stone; and in that it is at one and the same time, both in load and self-supporting, within moderate dimensions, we can readily conceive a square slab of concrete to be independent of support except on two sides of it. And here comes in the second doubtful point. If we had the strength of a slab of concrete stone as well known as that of a slab of granite or limestone, we should know exactly that with a certain thickness we could use it with safety for a certain projection beyond the supporting wall. To take an example: no architect would venture to fix a landing of granite projecting 4 ft. 6 in. from the supporting wall, and 6 in. thick, or to cover a space 9 ft. between the walls by slabs of granite 6 in. thick; in either case it would be recognised that iron beams under the joints would have nothing to do—would be superfluous. We have not that experience as regards slabs of concrete; we do not know how far they are to be trusted; and therefore I recommend the employment of iron in conjunction.

The only experiments of which I have any knowledge which have been made in this direction are those of M. Vicat, and one made at the Great Exhibition of 1851. M. Vicat made a beam of hydraulic lime and granite sand, as sketch, of the following dimensions:—



·03c

Experiment No. 7.

c. foot.
L 0·03 = ·098427

c. inch.
D 0·025 = ·98427

inch.
B 0·04 = 1·5748

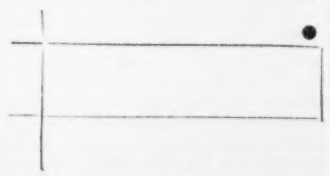
kil. cwt.
W 32·00 = ·62096

Experiment No. 8.

kil.
47·00 = ·92515

Applying the general formula $W = c\frac{ba^2}{L}$, we find the value of c to be, in No. 7, ·16 cwt., and in No. 8, ·235 cwt. These results are very low as compared with the value of c for other materials; as, for instance, 3 for Riga fir, 4 for red pine, 18 for cast-iron, &c. I cannot help thinking that the exceedingly small dimensions operated on were very unfavourable for an experiment of the kind on such a material.

The experiment made at the Great Exhibition of 1851 was somewhat similar. The beam was



of pure Portland cement, 14 in. long, 4 in. × 4 in., and it bore 1,580 lb. Adopting the same formula, this gives a value of 1·174 cwt. for c, or rather more than one-half the value for Riga fir. But as Portland cement loses its strength very materially by admixture with sand, we must reduce the constant very materially for this reduction; but, on the other hand, there is nothing easier or more natural than to increase the strength of the Portland beam by giving it a curved form underneath; and for the same reasons that we make a beam of iron of a parabolic form in order to collect the materials exactly into the place where they will produce the maximum of effect, so we should give the beam of Portland cement an arch form of the same shape underneath; and it is not improbable that this expedient would make up for the loss of strength caused by adding sand and gravel to the cement—or, in other words, of using concrete in place of pure cement.

One other thing to be borne in mind is, that in all cases of using cement concrete for covering over spaces the value of B becomes extended. In an ordinary beam we have B only a few inches, and bearing the weight of an average of 10 ft. of floor. In the Exhibition experiment the weight amounted to nearly 4½ cwt. per foot superficial of floor; and as the exterior weight for warehouses and factories is only reckoned at 2½ cwt. per superficial foot there was evidently great excess of strength, considering the proportion of 4 in. of breadth to 10 ft.

I must not dwell longer on this subject, or you will fancy I can never get down from my hobby. I do hope, however, that those who have the opportunity will try really testing experiments on concrete in this sort of application, and publish them for the benefit of the profession. I feel rather confident that the result will be that floors and ceilings combined can be constructed of concrete, which shall rival any other form of material as regards price, strength, and economy of space.

I think it desirable to add a few words as to precaution which may be used in lessening the tendency to catch fire in buildings which are not in their nature actually non-inflammable or intended to be so. Whenever timbers are exposed, it is very desirable to cover them with a coating of common whitewash, which acts doubly as a preservative, both by excluding air from the timber, and from its non-conducting power. This will, of course, be of no use when a fire has once been kindled and got to a head; but in case of fire, seconds of delay in kindling it or communicating it are of vital importance. In many a workshop or factory, if the floors and roof timbers were kept well whitewashed the risk would be much diminished. Special precaution should be taken about the floors and fireplaces: there is frequently great carelessness in trimming joists and fixing grounds for skirting, &c. It would be very desirable always to skirt chimney-breasts in cement or plaster, and to fill in the place under the hearthstone with cement concrete. Ceilings, again, should be formed with much stronger laths and better nailed; and if about 2 in. of rough mortar, the coarser the better, were laid over the laths between the joists, it would be found very difficult to set fire to them—they would resist for a considerable time even a fierce fire underneath. Again, all rooms should have a good height, otherwise the constant operation of gas-lights is to prepare the timber of the ceilings for combustion on the most rapid scale, if the opportunity be once given. As regards all stoves, great attention should be paid to their being so arranged as to avoid all risk arising from the heat of the stove itself, its flue-pipe, or its ash-pan; no stove should be considered safe the flue-pipe of which cannot be heated to redness with perfect safety to the building. But in all ordinary buildings the most important point to attend to is the staircase: it should be, if circumstances will admit, closed at top or bottom, cut off from the passages leading into the rooms, and in the construction of it it is very desirable to lath the soffits with extra strong laths, and fill in from the upper side with concrete, so that all the space at the back of the riser and under the tread shall be a solid mass of non-inflammable material. Such a staircase would probably stand and bear the weight of persons ascending and descending under circumstances where an iron or stone staircase would be destroyed or useless.

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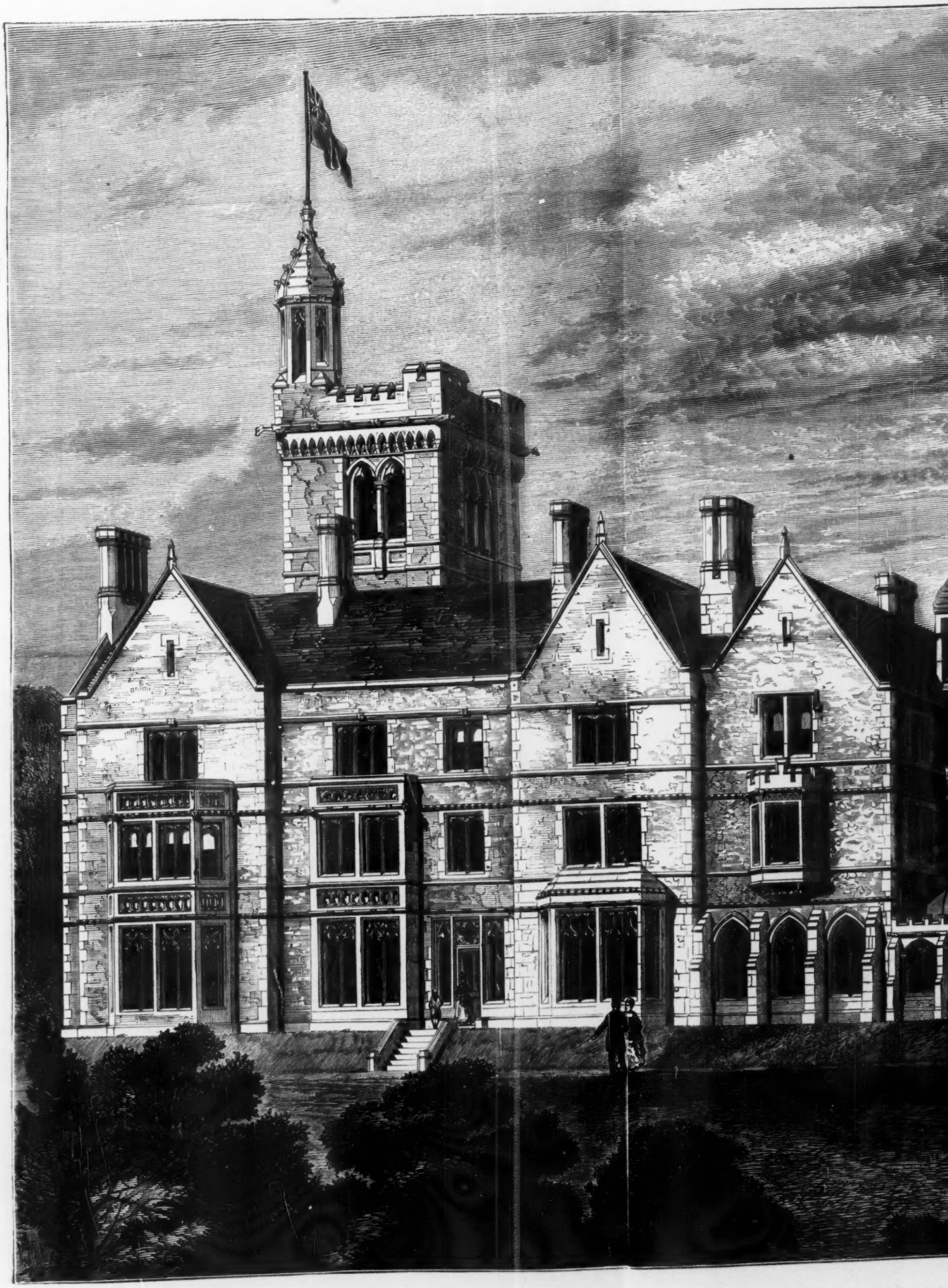
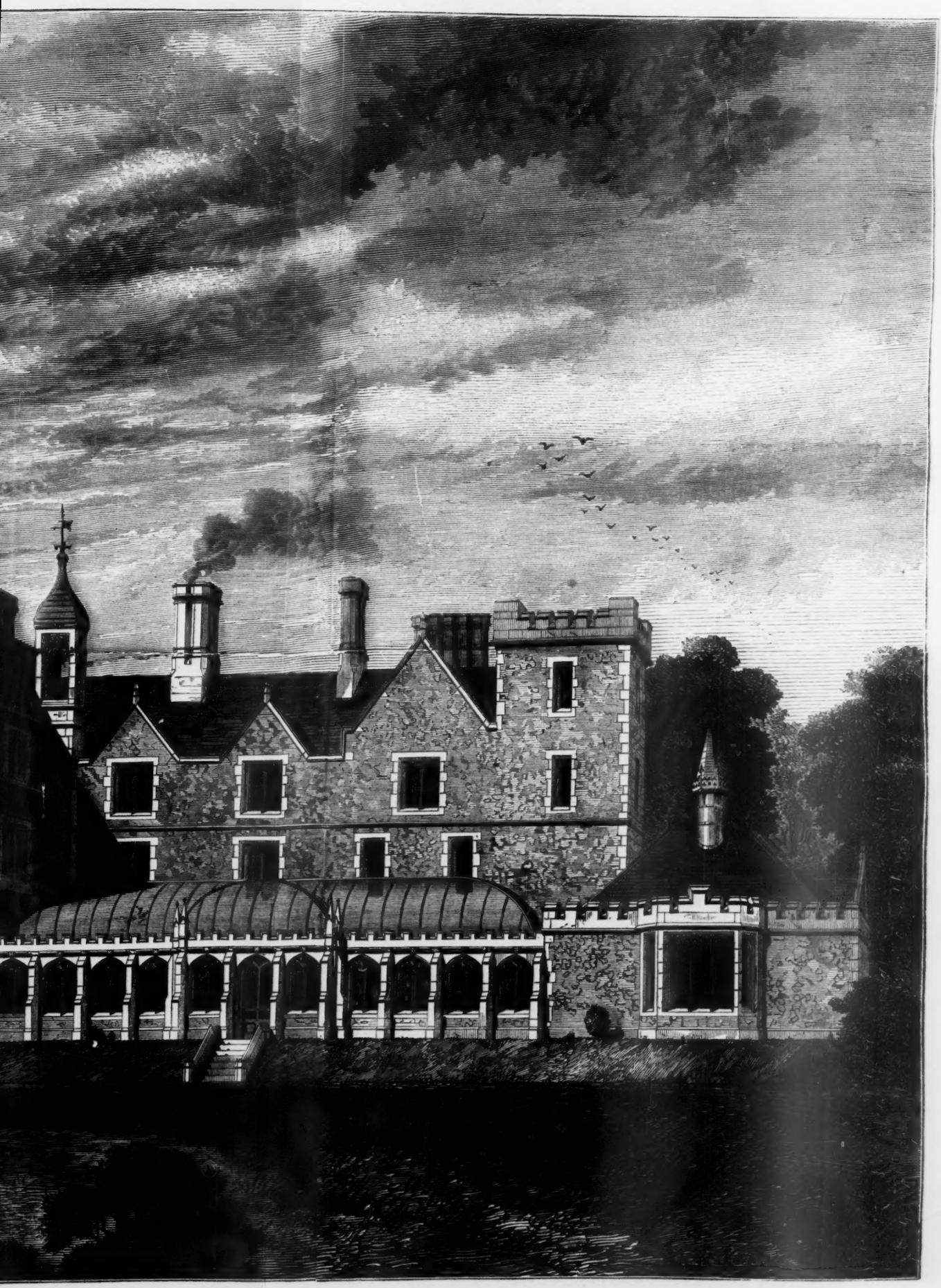


NUTFIELD PRIORY, SURREY.—M



—MR. JOHN GIBSON, ARCHITECT.

NUTFIELD PRIORY, NUTFIELD, SURREY.

THIS mansion, of which we give a view, is rapidly approaching completion. It is built for, and has been occupied by, Mr. Joshua Fielden, M.P., since Christmas, 1872; the pulling down of a portion of the former edifice having been commenced in September, 1870.

The approach through its park from the opposite side to which our view is taken is from the main road between Redhill and Nutfield, and is about a mile and a half from the former town.

Our view represents the south or terrace front, which commands a fine and extensive prospect over the counties of Surrey, Kent, and Sussex; whilst in the foreground is a large sheet of water surrounded by ornamental planting.

The house was intended only to be partially pulled down and rebuilt: therefore the character of the existing architecture had in some slight measure to be adhered to; and when it was decided to pull down and enlarge the main portion of the building, the servants' offices, &c., had already been roofed in: this of necessity caused some difficulty in the rearrangement of the plan.

The building throughout is faced externally with the hard lower bed of the local grey nobbled stone and Bath-stone dressings; the strings, copings, &c., being weathered, and of Box-ground stone. The tower over the principal entrance is carried up to a height of 86 ft., the turret to which has yet to be built.

The windows to the principal rooms of the ground-floor, hall, and staircase have arched stone traceried heads; the tracery is varied in design, and carving indicative of the purpose of each room is introduced. The roofs, excepting those to the towers, are high pitched, and are covered with boarding-felt and brindle-colour tiles. The hill to the north, and next the court-yard on the entrance-front, has been excavated, and buttressed retaining walls built, as shown on plan,* the ground rising thence to a height of 35 ft., and falling from the garden-front considerably. This materially determined the width of the building, and the terrace on which it stands.

Internally, the ground-floor is arranged as shown; the entrance-porch and cloistered arcade are stone groined with moulded ribs; and on the bosses are mottoes, with carved figures, foliage, shafts, and corbels supporting the ribs. The three windows of the latter are filled with richly-painted glass. The floor of these and the conservatory are laid with red and brown Mansfield stone in diagonal squares.

The conservatory, which is the only remaining portion of the former edifice, has been entirely rearranged, and its stonework altered. The flower-beds of this and the laying out of the ornamental planting generally have been carried out under the direction of Mr. Edward Kemp.

The entrance has a massive oak door, the vestibule an oak-ribbed and boarded ceiling, and is divided from the porch and staircase by wainscot oak double-swing glazed doors, with traceried upper panels, and fanlights.

The hall, which is carried up through the first floor, is 26 ft. high, and has an oak ceiling panelled with moulded beams and ribs, supported on carved stone corbels. The windows are filled with painted glass (executed by Powell & Sons), from the full-sized cartoons designed and drawn, and the glass, selected by F. R. Pickersgill, R.A., connecting the various dates, &c., with reference to the passing of the Factory (or Ten Hours) Bill, in which the late John Fielden, M.P., took a leading part.

The large bay window is richly carved externally with monograms and motto, &c., and consists of twenty-four lights, besides the tracery, the main front lights representing the different ages and methods of spinning. The eight top ones (four each) show when the upper classes employed themselves so usefully in that avocation, "with the spindle in the thirteenth century," and, until it was superseded, "by the wheel in the sixteenth century," whilst the four lower lights represent the work being done by operatives in the nineteenth century by the aid of machinery, steam power having superseded hand-work, rendering it one of the great commercial pursuits of this country. Two of the side upper lights represent the state of the operatives before 1816, and the opposite two after 1847; whilst the other lights have the names and medallion portraits of those who were instrumental in ameliorating the condition of the over-worked women and children. The borders to the whole of this window, and to the other two six-light windows of the hall (which latter have stained-glass medallions, containing the Lancashire and Yorkshire badges), are formed by the representation of the cotton plant, &c.

The hall is of oak wainscot, panelled to a height of 6 ft. 6 in., the upper ones carved with separate devices. The chimney-piece is of polished Hopton wood stone, and wainscot, richly carved, having a motto carved on the stone mantel. The archway leading to the principal staircase and garden entrance is delicately moulded and enriched with traceried spandrels, appropriate mottoes, and carving.

The artificial lighting of the hall is by a sunburner, with an ornamental bronzed ventilating pendant richly finished.

An open gallery crosses one side of the hall, forming a communication on the first floor, and is supported by oak-moulded trusses and stone corbels, having a wainscot handrail and traceried balustrade. The staircase is of stone, with a similar balustrade.

An organ with carved oakcase will be placed in the recess provided in the hall, the bellows to be worked by means of water-pressure.

The joinery of the drawing-room is finished with birdseye maple and king-wood inlay. The windows to this and the other principal rooms on the ground floor have gun-metal sashes with self-acting fasteners, and glazed with plate-glass in single sheets running between the outer stone and inner wood mullions and traceried heads. The ceiling of this room is plaster divided into quatrefoil and other ornamental panels, having mouldings and pateræ, and decorated with colour and gilding. The chimney-piece and fender are of statuary and Sienna marbles, having shafts and carved caps, with statuary jambs and mantel inlaid with Sienna, the glass over being specially designed to suit.

The joinery to the boudoir is of picked wainscot, the ceiling plastered and enriched. The chimneypiece here also is of statuary and Sienna, the frontispiece for glass over is of Sienna marble inlaid with carved statuary, enriched with corbels at intervals supporting brackets for china.

The library ceiling is wainscot panelled with diagonal moulded ribs, having carved bosses at their intersections, and boarded diagonally to a pattern. The walls and recesses are fitted with wainscot bookcases specially arranged. The chimneypiece is of Griotte marble and wainscot, richly carved, and over it is an ornamental silvered glass with carved columns.

The dining-room ceiling is of plaster, with appropriate enrichments; the joinery is of wainscot; the chimneypiece and fender are of Hopton wood-stone, with Emperor's red marble shafts, shelf, &c., moulded and enriched with traceried panels and carving. The doorway leading from this room to the cloisters has glazed traceried upper panels, and head with jamb linings well carved with fruit and other devices. The billiard-room, which is approached through the conservatory, is a large and well-lighted room, with an open-timbered roof, the joinery being of wainscot. The chimneypiece and fender are of Devonshire marble.

The offices are fitted up carefully.

In the basement are the necessary cellars, and a heating apparatus, which warms the hall, staircase, the principal rooms, &c., in addition to or irrespective of their fireplaces. The system is very economical in the consumption of fuel, and consists of a small boiler, from which are carried flow and return pipes to a central chamber in the basement story. This chamber is fitted with hot-water coiled piping, under and through which the fresh air enters; and below the ground-floor are air-tubes conveying the warmed air to each room through valved ornamental brass gratings fixed in the skirtings.

On the first and upper floors are arranged thirty bedrooms, a schoolroom, day nursery, sewing-room, seven dressing and (hot and cold water) bath rooms, housemaids' closets, linen and other closets, store-rooms, &c.

The rain-water from the roof is utilised, the washing water is afterwards used for garden purposes, and the other water to supply the house generally is from the Caterham Hills, stored and filtered through tanks, containing upwards of 21,000 gallons, formed in the high ground, at a level sufficient to supply the top floor, and to which pipes and hydrants on the several landings, and externally, can be attached hose in case of fire.

The house, stabling, and farm buildings are supplied with gas made at the latter. The drainage is used for irrigating the land.

The works have been well carried out by Messrs. W. Cubitt & Co., from the designs and under the direction of Mr. John Gibson, of Westminster, Mr. Hankins having acted as general foreman of the works, to the satisfaction of the architect.

* Plan will be given in a following Number.

PRESIDENTIAL ADDRESS IN IRELAND.

ROYAL INSTITUTE OF IRISH ARCHITECTS.

AT the *conversazione* of this Institute held on the 6th in the rooms of the Royal Hibernian Academy, the President of the Institute (Mr. J. H. Owen) delivered an address. After a few introductory observations, he said,—What is to be the future of architecture? What chance is there of a distinctly national style being produced among us? I believe that there is no chance whatever of anything of the kind; but, on the contrary, that, just as all the old distinctions of national costume are rapidly disappearing under the influences of easier intercommunication, and as it becomes more and more difficult daily to distinguish, by their appearance, the nationality of persons of the educated classes, so the distinctive characteristics of the architecture of the nations which are most advanced in modern civilisation will become more and more minute and evanescent; local colouring will disappear, and nationality of character will, to a great extent, merge in one universal modern style, which will have for its basis the adaptation of each structure to its intended use, with such ornamentation superadded as the nature and purposes of the structure may suggest, borrowing ideas both of construction and ornamentation from the past, using freely what has been done before, but never slavishly following arbitrary and empirical laws in anything. This, I feel convinced, is the tendency of the architecture of the future; and as it is undoubtedly in a right direction, it gives great promise of leading to right conclusions. It may be said, indeed, that this altogether excludes the idea of originality,—that if we are always to go on borrowing from the past, there exists for the future only a bald repetition of familiar forms and used-up ideas. But such use of old materials is inevitable in every mental pursuit which has attained a certain stage of development. Give the architect a differently constituted order of human beings to lodge, or different climatic influences to counteract, or materials to use of a nature different from any that have been before employed, and it becomes his duty to be original—to invent means and appliances for meeting the new wants which are presented to him, and counteracting the new and strange influences, and to originate, after due analysis and experiment, the best and most efficient mode of using his new materials; but as long as he has to work out the same old problems, with the same old data as all his predecessors have been engaged upon, he must be satisfied to work under the same old laws, the truth of which has been established by the experience of ages, and to seek for the credit of originality only in the right and just application of them. All other originality is the originality of conceit and ignorance, which, wilfully leaving the beaten paths, and striking out ways for itself, too often ends in quagmires and culs-de-sac, to the loss and discredit of the rash originator. At the existing stage of the history of the art, the only possible originality is to be found in the happy adaptation of old ideas to modern uses; in studying the work which we have to do in the same spirit which moved the excellent and honest architects of old, we shall perhaps succeed in producing such results as they would have attained, with the same objects to be aimed at and materials to be used,—we shall imitate without copying.

We are indebted to-night for our place of meeting to the graceful kindness of the president and council of the Royal Hibernian Academy, which it were ungrateful of us to pass over without public acknowledgment, and the more so as it has enabled us to solicit the honour of your Excellencies' attendance at this meeting, to countenance by your presence the efforts of Irish architects, as they are exhibited on the walls of these galleries. They are poor and humble enough, probably, in comparison with similar exhibitions in the great centres of the population of the world; but, as compared with the position and population of Ireland, they

cannot but be considered as showing satisfactory progress and tendencies in a right direction, which time, and the improvements in the social condition of the country which are undoubtedly taking place, will hereafter confirm and develope.

The Royal Hibernian Academy is indebted for their lodging in these very suitable and convenient apartments to the love of art and the liberality of one of my predecessors in office, Francis Johnston, who was architect to the Board of Works down to about the year 1830.* However much I, or any of his probable successors in the future may be tempted, by possession of the same feelings to imitate his action in this respect, there is very little probability of his ever being able to yield to the weakness, by providing the Royal Institute of Architects with a suitable habitation, or to contribute to the art-education of the country in any appreciable degree. The works that he is chiefly engaged upon are of a strictly utilitarian character, and must bear that character impressed upon their exteriors. I have sometimes experienced a feeling somewhat analogous to that of Hans Andersen's Ugly Duckling, as if I were cut off by the sphere of my duties from all the beauty and grace which are open to my more fortunate compeers, who are not limited, as I am, in the range of their works; but I have consoled myself by the reflection that ornament is not always beautiful,—nay, sometimes, that attempts at ornamentation only produce deformity; that simplicity is not always or necessarily mean; that plainness and ugliness are not, rightly considered, synonymous terms; and that there is room, even for the architect to the Board of Works, to contribute something towards the advancement of the art, by studying how to do common things well and honestly.

The great topic of the day, as far as our profession is concerned, is the necessity of adapting all our works, whether public or private buildings, whether single or in groups, to the rules and requirements of sanitary science. I am not going to dwell in this address on the subjects which it took our talented townsman, Professor Cameron, a course of lectures only to touch upon very recently. I only call attention to it to suggest the caution that, while it must not be ignored altogether, it must not be treated partially or one-sidedly, or suffered to engross our whole attention to the exclusion of other considerations which are of equal importance, and, above all, to maintain strict moderation, and avoid extremes. I may illustrate my meaning by calling your attention to the fact that water —that element of our daily food, on the supply of which, in a pure and wholesome state, we are so dependent for healthy, vigorous life—is not to be found in a state of absolute purity in nature; it is only with considerable difficulty that the chemist can procure it in that state for his experiments. The chemical analysis of a water which is of admirable quality for all the uses of man, reveals an amount of admixture of foreign matters that is quite startling until the test of experience is applied to the analysis, to determine whether the admixture is such as to afford wholesome food or deadly poison. In like manner we must carefully avoid allowing ourselves to be carried away by appearances—or permitting scientific facts to divert us from following the results of experience. It is an undoubted fact that prolonged breathing of the same air is prejudicial to health, but it is equally true that it is not necessary to establish a thorough draught through every room to make it habitable. We must dilute our science with a large measure of common sense, if we are to get out of it all the benefit which it is capable of affording us, and, without doubting or discrediting the results of scientific inquiry, use them in the true scientific spirit—not blindly or rashly, but definitely,—with careful relation to quantity and quality, and giving all the circumstances of each case their full weight and consideration.

* He died on the 14th of March, 1829.—ED.

NOTES FROM AMERICA: THE ST. LAWRENCE.

FOR a thorough enjoyment, let it be by water on board a magnificent steamer, with state cabins, where one can take a quiet nap either by day or night, get his three square meals a day, and can take a wee drop if he feels chilled. Having procured a ticket, and secured a cabin, we start from Prescott, a miserable dirty city in Canada; we then steam for Brockville, a lively smart city, picturesque in the extreme, and containing a number of large foundries, also good hotels, with all the life and vigour of a go-a-head Yankee city, though in dull Canada. From Brockville we start for the Thousand Islands, and truly the islands are indeed a sight never to be forgotten, lighthouses dotted here and there, islands undulating, flat, oval, and horse-shoe shaped. Passing St. Anne's, an enthusiastic Irishman reminded me that Tom Moore composed the "Canadian Boat Song" at this place, and he, with a sweet brogue, poured out the first line, "Row, brothers, row." From the Thousand Islands we touch at Kingston, Canada. Kingston possesses some very fine buildings, a penitentiary, and several banks, with a fine marketplace; business seems very dull in this city—enterprise apparently wanting. The convicts in the penitentiary are taught harness-making, lock-making, and grave and other stone cutting.

From Kingston the boat touches at Oswego, a sort of Wapping: here a lot of grain-elevators are to be seen in full work, piles of lumber, and a great many coal-wharfs. Oswego viewed from the river is not a very enticing place, it is in the New York State. From Oswego the steamer sails on until it comes to the Welland Canal, and has to pass, I think, about twenty-seven different locks. On the Welland Canal the city of St. Catherine is situated. St. Catherine's, though small, is a noble, picturesque, compact city,—the finest for beauty in the whole of Canada. The locks in the Welland Canal are closed on Sundays, so the steamer had to lie idle, giving the passengers an opportunity of visiting Niagara Falls, a distance of about nine miles from Welland. Niagara Falls is a scene never to be forgotten, and, so often described, that it will suffice to say that for hotel charges I have never met the like, and hope never to do so again.

Leaving the Welland Canal, we steam for Cleveland, in the State of Ohio. Cleveland is a pretty and dirty city—clean in one part, but shabby in another. The city is crowded with Germans, Irish, French, English, and Yankees; lager-beer saloons, gardens, and a goodly number of entertainments to suit the appetites of the various nationalities. To see a German or "Dutch," as they are called in the States, drink lager, one would, like Samuel Weller, say "his suction powers are very vast." The Dutch lager-drinkers can knock the spots off a Britisher at beer-drinking.

From Cleveland we start for Detroit, in the State of Michigan. Detroit is a fine city, and contains about 90,000 inhabitants; broad streets, several very fine buildings; the public institutions really are artistic, and worthy an architectural compliment. There is a great number of blacks, who seem to be lounging about waiting for something to turn up. Opposite Detroit is Windsor, in Canada, about as dirty a place as can be traversed; not a single street macadamised, no lamps, and muddy: the contrast with Detroit is glaringly striking. A ferry, fare 5 cents, runs from Detroit to and from Windsor every few minutes.

From Detroit we steam through the Saginaw Bay,—a rather rough place, but enjoyable to a good sailor. Saginaw is a lumber region. From Saginaw we then finish our voyage by arriving at Chicago. Chicago marble fronts; Chicago, "The City," as the Yankees call it, but marble fronts seems to me a synonymous expression. Everything seemed to be *hurried* up, not squarely and workmanlike built. The city, in my opinion, is remarkable for its growth, and the number of whisky saloons.

There is a magnificent hotel and railway depôt being built, but beyond a few buildings of a real architectural character, the city seems to me to have a name for wonders and smartness (and courts the same), really more from "gas" than "genuine reality."

A word for Mr. Arch. Your correspondent has seen the States and Canada, not from a railway carriage, but by observation on foot. Let him persuade the tenant-farmer, who is saving his 20*l.* a year, to stay in England, where he can see something, and be seen. A man to work for his grandchildren is very courageous; but if the hardship of cleaning up a bush-farm were really known, it would take the pluck out of the jolly, merry farmer-boy; let him swing an axe for ten hours, and see *then what is work.*

The poor chawbacon farm-labourer send out,—he can command decent wages, will have to work hard, but will be decently fed, and will not have to take his hat off to squire, lord, or lady; but he will find there is no place like home, if he can obtain anything like a decent living in the old country. Lastly, a word for clerks, shopmen, and no-trade men,—stay at home. Muscle, muscle; plenty of wood, water, and hard work, is the motto for an American emigrant.

QUERCUS.

THE HOOSAC TUNNEL.

AN opening has been effected between the opposite workings of the Hoosac Tunnel, an engineering work which is exceeded in magnitude in its class only by the Mont Cenis Tunnel.

The mountain to be pierced has two summits, with a wide valley between. The exact distance between the two portals is 25,031 ft. The eastern summit is 6,100 ft. from the eastern portal, and 1,415 ft. above the grade of the railway. The western summit is 6,200 ft. from the western portal, and is 1,704 ft. above grade. The two summits are something more than two miles and one-third apart. The lowest point of the intervening valley is 801 ft. above grade. A geological examination of the mountain by Professor Hitchcock, then one of the best American authorities, seemed to establish it as a fact that the formation was mica slate throughout, "mixed up, however, with a little quartz of an imperfect kind, which does not differ materially from the mica slate in hardness." This did not prove to be true, as a vein, several thousand feet thick, of very hard rock was struck some years ago, and caused a material delay in the completion of the work.

All sorts of inventions have been tested in the Hoosac Tunnel. There was one boring-machine that was to cut its way into the rock at the rate of 2 ft. an hour. It failed utterly. A great dam was constructed across the Deerfield River, which flows by the eastern portal, to furnish power for compressing air. The dam cost nearly 300,000 dols., and yet it was necessary to supplement it with steam-engines. Thousands of dollars were wasted on experiments with power drills, and there is perhaps no known explosive which has not been tested in the Tunnel. Since the Messrs. Shanly took the contract, all the drilling, except on the central shaft, has been done by means of compressed air driving-power drills, which are an American improvement on those that were used at Mont Cenis. At all the points of working except one the usual explosive has been nitro-glycerine. As a total result of the ten years' desultory working up to the making of the contract, only 9,338 ft., or somewhat less than two-fifths of the entire distance, had been pierced. The progress in 1869 was 1,688 ft.; in 1870 it was 2,864 ft.; in 1871 it was 3,553 ft.; in 1872 it was 4,456 ft.; in 1873 it has been 3,132 ft., completing the entire distance of 25,031 ft. The tunnel is completed from the east end to a point 750 ft. west of the shaft; that is, about 13,600 ft., and from the west end about 9,600 ft., leaving between about 1,850 ft., where the opening is of full width, but only 8 ft. high. The dimensions of the full-sized tunnel are 24 ft. in width, and 20 ft. in height, and its shape is nearly semi-circular, the variation being such as to give nearly the full height of each of the two tracks which will be laid through it.

The advantages of the tunnel are not so much a shortening of distance as a diminution of gradients. If Albany were the objective point of a railway, the "tunnel route" would be six miles the shorter. But on the Boston and Albany road there is an ascent of 85 ft. to the mile, as against 60 ft. on the tunnel line. Of course, as the tunnel is twenty miles to the north of the nearest point on the Albany-road, the distance also would be shortened if the idea be to seek a lake port where the produce of the West may be transhipped. This is, in fact, a part of the plan.

The tunnel will be completed in July. Unfortunately, the railway east of the Hoosac is in a bad condition. It has but one track, its location is as bad as it could well be, and the road-bed is utterly unfit for the transaction of a large amount of business. The same remarks apply, modified slightly, to the middle section, about fifty miles in length. The Fitchburg-road, the Boston-end, has a double track, but it is unprovided with freight-rooms, wharfs, docks, and elevators, such as a great through line should possess. The strange circumstance, therefore, of a great work that has cost 10,000,000 dolls. or 12,000,000 dolls. being, nevertheless, practically useless, seems likely to be presented.

The object of the central shaft, which was begun under the State Commissioners about ten years ago, was to supply four faces to work upon. When it had been sunk to grade in 1870, opera-

tions were begun in both directions; but large "pockets" of water were struck going westward, and only three faces could be worked. Water made so fast that immense pumps were put down the shaft, which raised it in three lifts 1,030 ft. at the rate of more than 200 gallons a minute. In 1872 the headings eastward from the shaft and westward from the east end, met in December. Soon afterwards the removal of the "bench" between the two points of working gave the water an opportunity of running harmlessly out at the east end, and westward work from the shaft was resumed.

More than three months ago Mr. Shanly estimated that the two headings would meet on the 1st of December. As a matter of fact he gained three days on his estimate. There are many circumstances of interest in connexion with the opening. The headings met with wonderful accuracy. The measurements have not been made; but the two lines cannot possibly vary more than an inch or two, and probably the error is less still. For a great part of this work the State is indebted to Mr. Wederkinch, a young Danish engineer, who has not only run all the lines in the central shaft section, but has invented and made with his own hands the necessary instruments. The amount of nitro-glycerine used at each blast was something enormous. The total quantity used was more than 150 lb., being nearly twice as much as was ever before put into one charge. The effect was in proportion. One great piece of rock, weighing upwards of a ton, was thrown directly outwards with such force that, at 100 yards' distance, it demolished the great wooden barrier which had been put up to protect those beyond. Another singular fact is, that the current of air sets steadily outwards. Heretofore the current between the east end and the shaft has depended on atmospheric conditions; now it would seem to be established that there will be a steady current through the entire tunnel from east to west when it shall be opened.

The *Times*, to which we are indebted for the particulars herein condensed, gives a longer account of the history and opening of the tunnel.

OPENING OF LONDON SCHOOL BOARD SCHOOLS.

York-road, King's-cross, Islington.—A new Board school has been opened in the York-road, Islington, by the Lord Mayor, and Mr. Charles Reed, M.P. (chairman of the London School Board), Mr. Currie (vice chairman of the Board), Mr. Chatfeild Clarke, &c. The total accommodation, it was stated, in the new schools, is for 1,388 children, thus divided:—boys, 512; girls, 354; and infants, 522. The building consists generally of three stories, the infants' department being on the ground floor, the boys' on the first floor, and the girls' on the second floor. There is also a small basement for the heating apparatus and coals, and a third floor forming a central feature in the elevation, containing apartments for the care-taker. The infants' department consists of two distinct schools, each comprising one L-shaped schoolroom, with two classrooms adjoining,—one for babies, the other for the more advanced infants,—also lavatories and cloak-rooms. The boys' department is divided into senior and junior schools, both on the same floor, and each comprising an L-shaped schoolroom and classroom adjoining, the schoolroom arranged for subdivision into two portions when desired, by Stone's patent partitions, and the inner boys' classroom divided into two by double sliding partitions, with semicircular double sashes over same. Lavatories and cloak-rooms for each department adjoin these schoolrooms. The girls' schools are designed upon a similar principle, but the schoolrooms are simple parallelograms. A drawing-class room, 25 ft. 6 in. by 18 ft. (top lighted), is placed to the rear of the schoolrooms on the second floor, and the staircases are so arranged that the rooms can be used by either boys or girls without interfering with the separation of the sexes. A manager's room, 20 ft. 6 in. by 18 ft., is placed on the first floor, under the drawing-class room, accessible from both the boys' and girls' staircases, and forming a means of communication for the care-taker to all parts of the main building. This room will also be used as a mess-room by the masters and mistresses, and waterclosets and lavatories for each sex are provided in connexion therewith. The boys' school and playground are entered from a newly-formed side street. A large archway, giving a central feature in the front elevation, forms a general entrance for the girls and infants, who will also have the same playground. The building is warmed by the system of Messrs. Price & Co., of London, by which the cold fresh air is warmed by passing over hot-water vessels, and is supplied therefrom to the several rooms and staircases by means of flues having valvular entrances, so that the supply of warm air can be regulated at pleasure. This system will also in summer provide for a full supply of cold fresh air through the flues into the rooms, when the apparatus is not required for heating purposes. In connexion with the warming is the ventilation, which is provided for by means of perforated zinc panels in the ceilings, through which vitiated air escapes into flues from which it is drawn by a rarefying apparatus placed in the turret. This system is supplemented by a large portion of every window being made to open, and windows being placed on both sides of all rooms, ample through ventilation is provided. The several entrances and staircases have been so arranged that there are no corridors, a general landing on each floor giving all the accommodation requisite. The building is of Gothic character. The principal elevations are faced with red Suffolk bricks with stone and terra-cotta dressings. The cost of the schools has been 12,000*l.*, including site, which is at the rate of 8*l.* 15*s.* per child; the cost of the building, including extras, 9,450*l.*, or 6*l.* 15*s.* per child. The schools were built by Messrs. W. Henshaw & Co. The architect is Mr. T. W. Aldwinkle, of London, whose designs were selected in a limited competition.

Battersea.—Two spacious blocks of school buildings, erected in Battersea under the auspices of the London School Board have been opened for the reception of scholars. One of these, in Bolingbroke-road, accommodating about 580 children, has been in one of its sections open for several weeks; but the part appropriated to the girls began its useful work on Monday in last week for the first time. Here there were 148 boys, 48 girls, and 130 infants; and the number would doubtless have been equal to the capacity of the buildings, but for the absence of publicity to the fact of the opening. The value of publicity in these matters was shown in the influx of children to the new schools in Winstanley-road, near to Clapham Junction Station. The place was besieged with parents accompanying children whom they sought to enter on the school register. Those actually received comprised 100 boys, 160 girls, and 170 infants, besides 150 boys brought from the Board's temporary school in the neighbourhood, so that 580 places out of 700 may be said to have been filled up on the opening day. The lighting of the rooms, the heating, and the ventilation appeared to be excellent, both in Winstanley-road and Bolingbroke-road; but the limited area of the playground in the former case calls for enlargement. Mr. Robson is the architect, and Mr. G. Stephenson the builder. Mr. Noble, the inspector for the south and west divisions, witnessed the opening at Winstanley-road, and then went on to Bolingbroke-road, before going to Monnow-road, Bermondsey, where a third school for 1,100 children was inaugurated.

THE TRADES-UNION CONGRESS AT SHEFFIELD.

THE sixth annual meeting of this Congress is taking place at Sheffield. Mr. William Rolley, President of the Sheffield Trades Council, was on Monday (the first day) appointed chairman of the Congress, and took the chair Mr. Alfred Bailey, Preston, was appointed vice-president; Mr. Prior, Sheffield, secretary; Mr. W. Allen, London, treasurer. For the office of auditors, Messrs. Casey and Knight were elected.

The Credential Committee presented their report, which showed that about 120 amalgamated national and confederated societies were represented by delegates, and that the number represented was between 900,000 and 1,000,000. The principal associations were Lancashire, Cheshire, Derbyshire, Factory Lists Reform Association, including men, women, and children, 236,000; Glasgow Trades Council, 140,000; Miners' National Association, 130,000; Amalgamated Associated Miners, 105,000; Amalgamated Society of Engineers, 42,600; Amalgamated Iron and Steel Workers, 35,000; Amalgamated Railway Servants, 25,000; Operative Masons, London, 22,000; Amalgamated Carpenters and Joiners, Manchester, 12,000; London Trades Council, 10,758; Operative Cotton-spinners, Lancaster, 11,927; Ironfounders, England, Ireland, and Wales, 11,748; Staffordshire Miners' Association, 8,700; Boilermakers and Shipbuilders, Sunderland, 13,500; Tin Plate-makers, Swansea, 4,000; Wigan Trade Council, 9,500; Shipping Trade Council, Liverpool, 2,147; Brassworkers, Birmingham, 5,000; Edinburgh Trade Council, 10,000; Birmingham Trades Council, 10,000; Liverpool Trades Council, 5,667; Sheffield Trades Council, 4,000; United Kingdom Coachmakers; Kent Agricultural Labourers' Union, 9,000; Oldham Trade Council, 2,500; Bolton Trade Council, 2,000.

The secretary read the report of the Parliamentary Committee, which was a very long one, commencing with congratulations on the rapid growth and development of the trade-unionism during the year, the progress made having been unparalleled, especially in those branches which had hitherto been but badly organised. The funds had also correspondingly increased with increased pay and shorter hours of labour. The Congress had continually to contend with misrepresentation in the press and on the platform; but the committee had been able to hold their own by setting right the misinformed and resenting and exposing the calumnies of the unscrupulous. The efforts that had been made in connexion with the Criminal Law Amendment Act, the Masters and Servants Act, 1867, the Conspiracy Laws, the Trades-Union Act, 1871, the Juries Bill, 1873, Compensation to Workmen Bill, Payment of Wages (Truck) Bill, and the Factories Nine Hours Bill, were reported in detail, and the deputation to Mr. Lowe were encouraged to believe that the Government would deal with these questions in a just and liberal spirit. The federation of employers did not cause the committee any fear of disastrous results. The committee had never desired warfare in any sense, and they hoped that peaceable arrangements would be brought about through friendly intercommunication between that federation and the Parliamentary Committee. A reply to their statements had been prepared by Mr. Henry Crompton, and would be presented to the present Congress. The report expressed a hope that a reform would be effected in the mode of appointment and removal of the unpaid magistracy, and especially with a view to the appointment of stipendiaries in all parts of the country. The report closed with the Parliamentary programme for 1874, which includes repeal of the Criminal Law Amendment Act, alteration of the Masters and Servants Act, so that a breach of contract shall not be a criminal offence; alteration of the Law of Conspiracy in accordance with the Solicitor-General's Bill; the reconstruction of the Small Penalties Act; the summary jurisdiction of magistrates; reduction of the qualification of jurymen, to admit workmen; compensation for workmen in case of accident; the Factory Nine Hours Bill; weekly payments in money; and an Act for the better protection of seamen's lives by preventing the sending of ill-found and unseaworthy vessels to sea.

The financial statement showed that, including a balance of 119*l.* 18*s.* 4*d.* from last Congress, the receipts of the Congress were 543*l.* 18*s.* 6*d.*; the expenditure, 393*l.* 19*s.* 4*d.*; leaving a balance of 149*l.* 19*s.* 2*d.*

The new president brought under notice, on the second day of the congress, the purposes for which, from time to time, their Congress meetings were held. One of those purposes was for the furtherance of the most blessed of all principles, that of one common brotherhood. Another was to discover their weak points as an organisation. Another object was to seek to rectify the wrongs under which they, as working men, groaned. He rejoiced that they had their Parliamentary Committee. To him it was a point of great importance how the power of the Parliamentary Committee could be increased.

After treating on political and other points of interest to the Congress, the president closed with an appeal to trade unionists to go forward confidently in the hope that victory, although it might be delayed, was certain to come.

Mr. Henry Crompton read a report upon the memorial presented to the Home Secretary by the National Federation of the Associated Employers of Labour. The thanks of the Congress were tendered to Mr. Crompton for his report, which was ordered to be printed as a trade union tract.

The Congress then proceeded to consider their future programme. Mr. Mundella, M.P., was requested to introduce the discussion of the

Criminal Law Amendment Act. He did so, narrating the steps that had been taken to amend that Act in a spirit of fairness to the employers. He was ignorant of the Government intentions, but he was under the impression that Mr. Lowe would surprise them on this point. He was strongly in favour of the entire repeal of the Act.

Mr. George Potter advised united action and pressure being brought to bear on members of Parliament.

Professor Goldwin Smith, who was received with loud cheers, said although he had been absent from England for five years, his heart had never ceased to be with his old friends in their cause.

Mr. George Odger moved a formal resolution asking Mr. Goldwin Smith to speak on emigration, which was one of the most important questions at present before the working classes of this country. Resolution passed.

Mr. Plimsoll, M.P. for Derby, was warmly received.

The Congress resumed its sittings on Wednesday, when the Criminal Law Amendment Act was a prominent topic of discussion. A resolution, moved by Mr. Potter, and seconded by Mr. Odger, was carried, expressive of satisfaction at the progress made during the year, with the agitation against the Act, and further, pledging each delegate, individually, to use all possible means, by agitations, public meetings, &c., to further the cause. It was also resolved that the Conspiracy Laws required amendment in the direction of the Bill brought in last session by Sir W. Harcourt.

On Thursday morning the delegates were to breakfast with Mr. Mundella, M.P., at the Victoria Station Hotel, Sheffield.

A meeting of the representatives of the Trade Councils of the United Kingdom, representing 202,474 members, has been held in Sheffield, to discuss the question of forming a federation of the Unions. The following resolution was passed:—"That in the opinion of this meeting a great advantage will accrue to the labour population of the kingdom by a federal action of the Trade Councils throughout the country, in order to support those trades which belong to any Council in the federation, and agree to act on this principle for the general welfare of organised trade societies."

WANDSWORTH SURVEYORS AND CONTRACTORS.

SIR,—I see the *Builder* is the one only professional paper which has even alluded to this matter,—certainly the most flagrant case I have, in a long professional life, "come across," as Dr. Kenealy says.

You will see by the local paper, inclosed, the agitation in the parish is still going on. My house is in Wandsworth; and, though I know absolutely nothing of the three implicated surveyors and their subordinates, I have been at the pains to collate the whole affair, from its commencement last Midsummer, and send it to you in a roll some considerable number of yards long.

As the case stands up to this writing, the Local Board has,—

1. Disqualified Neale & Co. from ever again tendering in their parishes, because they stand charged with bribing surveyors, their under-surveyors, and foremen of roads.

2. Discharged all the subordinates, *sans* benefit of clergy.

3. Condoned the asserted *laches* of all the surveyors; on the plea, I suppose, of the traditional jury verdict,—"Not guilty; but we hope they will not do it again"!

If the *Builder* will not take up such a case as this, I for one shall begin to question its very *raison d'être*. W.

THE EXETER ARCHITECTURAL SOCIETY AND THE CATHEDRAL REREDOS.

WE are requested to publish the following:—

The Committee of the Exeter Diocesan Architectural Society desire at this time to reaffirm certain principles which the Society has always felt itself bound to maintain to the utmost of its power; and they unanimously resolve:—

1. That natural and revealed religion alike sanction that general principle which bids us offer of our best to God, and consecrate the highest efforts of human genius, taste, and skill to the service of the sanctuary.

2. That this principle applies with special force to the productions of art in all its branches.

3. That some of the greatest triumphs which art has achieved have been won by her, when she has been working as the handmaid of religion.

4. That the highest forms of art, when employed as decorations of God's house, and as adjuncts to His holy worship, are means of creating and elevating devotional feeling, and of setting forth the honour and glory of God.

5. That the exclusion at this time of any one particular branch of art from the service of religion, and the restriction of that branch to secular uses only, on the ground that it has at some time been abused, is arbitrary and illogical—for the same objection applies with equal truth to every other branch of art—and such restriction would act injuriously both on religion and on art; on religion, by limiting the extent of the services which it has a right to receive from art; and on art, by withholding from some one branch of it that influence which has inspired its loftiest aims and noblest efforts.

6. That the employment of sculpture, both in wood and stone, for the adornment of churches by representations therein of

(*a*) Persons,
(*b*) Natural objects,
(*c*) Events of Sacred History,

is only a particular instance of the operation of the general principle set forth in Resolution 1; and is regarded with warm approval by this committee; because it

(*a*) Responds to the common instincts of Christianity;
(*b*) Conforms to the analogy of the Divine works in the Universe;
(*c*) Obeys the Divine will as declared in Holy Scripture.

7. That for these and other reasons it is the bounden duty of all thoughtful Christians to cherish and defend the use of sculpture and the sister arts in our churches; and to oppose to the utmost of their power the iconoclastic spirit, wheresoever, and by whomsoever it is exhibited.

J. L. FULFORD, BARTHOLOMEW C. GIDLEY, } Hon. Secs.

THE NEW APPROACHES TO THE RIVER AT LIVERPOOL.

AN engineering work of great magnitude, at Liverpool, which has been in progress for upwards of eighteen months, has now been considerably advanced towards completion, and is expected to be finished and ready for opening to the public early in the present year. The works to which we allude are the new approaches from the town to the river Mersey, for the purposes of carriage traffic across the river from Liverpool to Birkenhead, as well as to facilitate passenger traffic. The works are on a gigantic scale, and involve the filling up of one of the dock basins (St. George's), on the margin of the river, containing an area of between two and three acres in extent. The magnitude of the undertaking may be conceived when it is stated that in filling up this basin, no less than 169,000 cubic yards of earthwork and refuse have been required, which, in addition to that supplied by the Dock Board, who are executing the work, have been furnished by contractors, builders, and others. Whilst the basin was being filled up, a river-wall across the entrance to it was also in progress, and this part of the work has now been built up to the coping level. The approaches, connected with the roadway from the town, will be by seven short bridges, together with an immense floating bridge, falling 1 ft. in 21 ft. at the lowest state of the tide. The sides of this bridge are built of Scotch granite, and the roadways on either side will be 100 ft. and 150 ft. in width respectively. The floating bridge will be connected with an enormous landing-stage in the river, 2,000 ft. in length, and 80 ft. in breadth. This ponderous structure will be formed by lengthening and connecting two landing-stages, the George's and the Prince's, which are already moored in the river for the use of ferry and sea-going steamers. In order the more effectually to connect the new approaches with the neighbourhood of the Exchange, a new thoroughfare is contemplated, which, if carried out, will involve the taking down of office property in that locality, which is of great value. In anticipation of the opening of these river-approaches, the Birkenhead authorities contemplate a better mode than that now in use for conducting cross-river traffic, and with this view they some time ago invited designs, offering premiums of 200*l.*, 100*l.*, and 50*l.* respectively. These designs are now open to the inspection of the public, at the municipal offices at Birkenhead, including the three to which the premiums have been awarded. The designs for the approaches at Liverpool, now in progress, were furnished by Mr. Lyster, the dock engineer, and are being carried out under his superintendence. Their estimated cost is 150,000*l.*

CHIMNEY DRAUGHTS.

IN answer to the inquiry of your correspondent in your impression of the 3rd instant, I have to state that the theory of chimney draughts is fully treated in the following works:—"Professor Robison's Philosophy" (by Brewster), 1822, vol. iii., pp. 683–692; *Nicholson's Journal*, vol. ii., p. 269, &c.; "Annals of Philosophy," vol. xix., p. 408, &c.; *Quarterly Journal of Science*, vol. xiii., p. 113, &c.; Gregory's "Mechanics," vol. i., pp. 486–515; Rees's "Encyclopædia," article "Furnaces"; "Warming and Ventilating," by an Engineer (Underdown, London, 1825), pp. 144–174; Tredgold "On Warming and Ventilating" (London, 1836), p. 76; Hood "On Warming and Ventilating" (fourth edition, London, 1869), p. 366, &c.; "Proceedings of Royal Society" (Dr. Ure), June, 1836; Ure's "Dictionary of Arts and Manufactures," article "Chimney."

These several references give (so far as I am aware) all the information which science has yet produced on this subject. The method of Montgolfier is stated in several of these works, notably so in Hood's and Ure's works, and incidentally in several of the others.

These several references give the methods adopted by Davies Gilbert, Sylvester, Gregory, and Tredgold, as well as that of Montgolfier, as already stated. F. R. S.

MODERN ART AND ARCHITECTS.

THE tenor of the remarks by Mr. Whitaker in your recent issue entitled "A New Era of Art," is quite in accordance with my own, and deserve perusal. If the "architecture" and "architects" of the present are to maintain the character and respect which ought to be maintained towards them, it will certainly be from a mode of thought and action which at present seems at a great discount among the profession. With a few exceptions, chiefly the work of men uninfluenced by a fashionable age and patronage, or the powerful current of conventional taste which naturally belongs to metropolitan art, there is really no *genuine* art to be found. When I say *genuine*, I mean art which is *fittest* and most in accordance with modern wants and science, which adapts to a larger extent than has yet been seen, the materials which belong to our age; which openly and boldly accepts all the principles and improvements which science has thrown in our way without hesitation and free from a blind infatuation for the things of the past; an art, in a word, which accepts the dicta of progressive thought without a faltering waveringness. If the profession still pursues the dead past in preference to the living present, by a miserable and slavish adherence to the form and detail of everything that savours of Mediævalism and the Dark Ages, the inevitable result will be the greater divergence, if not total separation, of the science and art they profess; a greater gulf than at present exists will be made between construction and "art;" and ultimately probably the handing over of all our important works of construction to the civil engineer or constructionist. Thus the best and noblest part of art's heritage will be snatched from a race of professional fashion-mongers, who, forgetful of the two-fold character of architecture, have chosen the lowest and most paltry sphere of work—the decorative divorced from the constructive. It will be notoriously true that the only real architecture of the nineteenth century, in fact the only real art, will be in the engineering works, poor as some may be, yet still attesting the struggle between intellect and modern taste,—between a rapid and ceaseless progress and the demands for the æsthetic element.

The very tendency of modern professional art-teaching is an affected disregard for the

scientific part of the profession,—a total surrender of intellect to mere sentiment, and the archæological element of study. Such a mode of thought is, with a certain class of society, greatly in favour just now; but however the modern architect may assume an indifference to the demands of progress and science, he may rest assured that he is in open antagonism with the spirit of modern thought; that he is battling against tremendous odds; and that the progressive tide of modern demands, scientific skill, and educated tastes must quickly overtake him.

It may be noticed as a proof of this sad degradation of architecture proper, for which Bartholomew so ably pleaded, that the last quarter of a century has abounded in works of a reproductive, archæological, and decorative character, to a noticeable exclusion of any able or original works on art or constructive architecture, from architects, those which have appeared having been mainly supplied by the engineering profession.

This one fact is sufficient to indicate the intellectual repute and education of modern architects, and serves too plainly to account for their position among other professions.

G. HUSKISSON GUILLAUME.

SOCIAL SCIENCE ASSOCIATION.

AT a meeting of this Association, held under the presidency of Mr. W. Newmarch, Mr. F. Hill read a paper on "Local Taxation and Local Government," starting with the proposition that all governments were, in fact, partnerships for purposes which could not be achieved by separate action. Mr. Hill proceeded to consider whether the principles that applied to ordinary partnerships could not be made to apply to government partnerships also. In ordinary partnerships each partner contributed in proportion to the benefit he expected to derive, and in the same proportion was his share of power. He applied these two principles to local and general taxation and government. Poor-rates, highways, bridges, drainage, and elementary education he made local charges, but the maintenance of prisons and police, he thought, devolved upon the State. With good management he thought that local taxation might be diminished to the extent of four millions, and that the whole cost ought to be borne by the land, which, to the extent to which it was liable, was, he held, virtually the property of the State. Mr. Hill argued that, except for paupers, there should be no exemption from taxation, making, however, a distinction between permanent and temporary incomes. He would, however, levy special taxes on house and coal and other mine owners, to recoup the ratepayers for any cost entailed by unhealthy dwellings or ill-ventilated or ill-protected mines, in consequence of the resulting epidemics or accidents. He would continue the income-tax, and assess every one except the actual pauper. Turning to local government, he would abolish all magisterial financial authority, and would transfer it to the ratepayers.

A short discussion ensued.

THE HACKNEY DISTRICT BOARD OF WORKS AND THE "BUILDER."

THE report of the Sanitary Committee of the Hackney District Board of Works is now before the public, *in re* the "Homes in Homerton." If we are asked to accept it as "a minute and careful survey" of the nuisances we exposed and pointed out by name and locality, the labour of the committee becomes little less than a libel on sanitary inquiry and inspection.

The complaints we preferred and substantiated by a painstaking house-to-house and street-to-street visitation, are designated as "exaggerated." The committee, while admitting that certain nuisances exist and have existed, take credit for some previous vigilance on the part of the officers of the Board. This is a poor set-off against negligence, made patent by our description of the district. The report as a whole is a lamentable one, and exhibits a confused weakness and, shall we add, incapacity for dealing with such matters. It will not do to throw the blame on bad landlords, or to excuse accumulations of filth, and choked drains, by attributing them to the dirty habits of the inhabitants. The Nuisance Removal and other Sanitary Acts clearly provide for removal of offensive and dangerous nuisances and obstructions; but the Hackney Board seem to be of the opinion, that normal cesspools may be created in every street, and that their only power consists in simple remonstrance. We are told nothing about Hackney Wick, and whether that district will come in for a special report or not we have yet to learn.

THE TRAFFIC FOR THE LAW COURTS.

SIR,—The new Law Courts are, I believe about to be commenced, and must unquestionably involve an immense amount of heavy traffic—stone, brick, timber, iron, &c.,—to and fro for some years to come.

How is such traffic to be disposed of, so as not to inconvenience the public, and so as to avoid the existing streets being, as it were, choked up with the extra carts, wagons, and other vehicles which will be thrown upon them? It is a difficult question to answer.

If the extra traffic be diverted into Fleet-street and the Strand (Temple-bar intervening), or Chancery-lane, the state of such thoroughfares will remind one of the condition of London Bridge, with the traffic across it, as arranged years ago.

I suggest that, by the pulling down of one or two houses in Holborn and on the west side of Great Turnstile, a new direct and wide street from the North to the South of London would be formed which would give a direct access to the site of the new Law Courts; thus,—*viâ* Red Lion-street, the north side of Lincoln's-inn-fields, and Serle-street.

A glance at the map of London will show the matter at once, and it is certainly worthy of notice just now, when, for the circumstances named, the existing streets are likely to be found insufficient.

A RATEPAYER.

"PRO ECCLESIA DEI."

SIR,—I drew attention recently to a singular advertisement in the *Church Times*, that under the above heading ran:—

"Who will send one shilling to help two boys to restore a very fine old rood-screen in Bicknoller Church?"

The vicar writes by this post that an eminent architect has the matter in his hands, and begs me, through the medium of your columns, to correct the mis-impression that might otherwise occur from my letter. This I readily do, and wish every success to the fine old rood-screen. Your readers will be relieved to hear that it has other friends and champions anxious for its well-being and preservation, besides the "two boys."

H. H.

THE NEW-ROAD ENCROACHMENTS.

SIR,—In your leading article of last week's *Builder*, giving a history of the New-road, now called the Marylebone and Euston roads, it would be interesting to know further how it is that the forecourts are now so rapidly being built on, seeing that the Act of Parliament under which the road was laid out prohibits any building being erected thereon. This road, if left in its original state and width, would be the finest in London, which now requires it more than ever, seeing that three at least of the main lines of railway entering London abut upon it. My object in writing is to inquire whose duty it is to prevent these encroachments.

A. M. G.

THE SANITARY CONDITION OF CAMBRIDGE.

IN a letter to the editor of the local *Chronicle*, Dr. Latham says,—

"Whatever doubt may exist as to some of the theories regarding the spread of typhoid fever, no one at all conversant with the subject will, I think, deny that the readiest and surest way to spread the disease is by allowing sewage containing the excrement of fever patients to percolate through the soil, and contaminate the drinking-water in the wells; and that this mode of propagation is abundantly provided for in Cambridge there is ample evidence. In a report presented to the British Association in Liverpool, in 1870, it stated 'that the sanitary condition of Cambridge, as regards its sewerage and drainage, is exceedingly bad. The outlets of the public and private sewers are all under the level of the surface of the water of the Cam; consequently the sewage is banked up by the sewers for a considerable distance, and the subsoil is constantly saturated with both water and sewage in the lower part of the town.' .... Can it be wondered at if outbreaks of typhoid fever are frequent here? It is, moreover, well known that water contaminated with sewage, provided it does not contain typhoid excreta, may be, and often is, for a considerable period, used for drinking, without any injurious results; and in this way many districts in Cambridge where the people use contaminated water escape fever for a time; but let one single fever patient be introduced into the district, let the excreta find their way into the sewers, and so into the wells, and then those who use the water are soon conscious of the deadly poison it contains."

Again he says,—

"The evidence which has hitherto been advanced by medical authorities, to show that typhoid can be contracted by breathing contaminated air, or air loaded with sewage-gas, is very far from conclusive. Foul air may produce other diseases, and by its lowering effect upon the constitution, may render individuals more susceptible to the typhoid poison when swallowed; but that the germs can be introduced into the system through the air is, in my opinion, I will not say impossible, but in the highest degree problematical. In a very large proportion of the cases of typhoid which have come under my care, in the hospital and elsewhere, during the last three years, the disease could be clearly traced to drinking contaminated surface-water."

Proper drains, as Dr. Latham remarks, should be constructed, and these should be properly ventilated; and, in the mean time, the inhabitants should only use water which is sure to be free from sewage contamination. Fortunately for Cambridge, the inhabitants possess this, if they choose to avail themselves of it, and there is no occasion for contaminated well-water being used at all. The waterworks company furnish an abundant and constant supply of pure water from the chalk,—the only defect being its hardness,—quite free from the possibility of sewage contamination. The number of cases of typhoid is insignificant of late, in comparison with what existed in former times, when the disease was known as "Cambridge fever." This must be attributed to the establishment of the waterworks.

ARCHITECTS' DIFFICULTIES IN THE NORTH OF ENGLAND.

THE county architect for Durham, in his last report to the Quarter Sessions, thus alludes to his difficulties in getting the several county jobs under his supervision completed:—"As I mentioned in my last report, although works may be able to be let, it is impossible to get them finished and completed in any reasonable time. Materials and labour of every description are unprocurable, and the duties of the engineer or architect at the present time (he being generally looked upon by his employers as the person who ought and must push on the work) are of a most disagreeable and arduous description."

The unhappy architect, it appears, is urged on to complete bridges, police stations, and an addition to the county prison.

A brother architect, retained for the enlargement and restoration of the ancient Church of St. Giles, city of Durham, has to meet that which appears to be a novel and new attitude taken up by masons; for the builder who had sent in the lowest tender has since withdrawn from his intention to contract in consequence of his mason having demanded a sliding scale which would raise the amount of his sub-contract in proportion to any increase of wages that might arise. The job has, therefore, been offered to and accepted by Mr. John Brown, of York, whose tender, although 330*l.* higher, was the next lowest upon the list.

The net amount of this contract (including chancel fittings, 240*l.*) is 6,393*l.* Adding to this, 500 guineas architect's fees, salary of clerk of the works, and sundries, the total cost of the church will be about 7,000*l.*, which has been subscribed. The building committee is to have the benefit of the sale of the old lead, which is of great thickness and weight.

[If the opinion of the *retired* builder be of weight, the stonemasons' wages are not yet settled; but it is their intention to demand what is termed eight hours' work, eight hours' rest, eight hours' play, and eight shillings a day.]

WASTE AND CONSTANT SERVICE WATER SUPPLY.

A PAPER has been read by Mr. Deacon, the Liverpool borough engineer, to the Lancashire and Cheshire committee of the Association of Municipal and Sanitary Engineers, in the Council Chamber at Liverpool, in which he stated what appeared to him to be the inducements to undertake systematically the prevention of waste; next, his experience as to the working of the district waste-water meter system, and the results. The best form of the waste-water meter, he said,—

"consists essentially of a vertical tube lined with brass, and equal in diameter at the upper end—where it is connected with the inlet from the main—to the diameter of that main, but larger at its lower end. In the tube is a horizontal disc of the same diameter as the main, with a vertical spindle on the centre of its upper face, from the end of which the disc is hung by a fine wire passing out at the top of the tube through a brass gland. This wire is connected above with a counter balance weight, which, when the water is at rest, retains the disc at the top of the tube, which it completely fills.

It is obvious, then, if water is caused to flow through the instrument, the disc will find somewhere in the tube a position which it will retain until the velocity of the water changes. The lower end of the conical tube being about double the area of the main, no obstruction to the flow can take place, such as must necessarily be the case in all piston meters, while the motion for any given increment of velocity near the top, or place of minimum flow, can be made equal to, or even greater than, that due to an equal increment at the bottom or point of maximum flow, so that its sensitiveness is not diminished at low velocities—a feature which is unattainable in any meters constructed on the turbine or analogous principles."

The process of detecting the various kinds of waste, and the system to be ultimately adopted in order to prevent its recurrence, were then described, and the paper thus concludes:—

"The work can easily be performed by two meter inspectors and two boys, with the reserve of one inspector and one boy, who, in addition, will wind up the clocks, and do any other necessary work in connexion with the meters.

Any district, the consumption in which the diagrams brought in show to have increased unduly, will be ex-

cluded from the general inspection, and omitted by the ordinary meter inspector. Two or three special inspectors will at once be sent into it, and there is no doubt that a few days' work, or even less, will generally bring it back to its normal condition.

The advantage of such a system is manifest. Without it, waste-water inspectors discover only superficial defects, and spend their time equally on good and bad ground; but the best evidence of its value is the unprecedented success which is attending its adoption in Liverpool.

I do not now propose to speak of what I really think we shall be able to do here, but the result up to the present time is, that out of a population within the borough of about 500,000 persons with eight to ten hours' supply, and without the borough of about 125,000 persons with constant supply, taking in each case about 24 gallons a head (excluding only water used for trade purposes), we commenced work in a district within the borough of 31,000 persons, who were taking only 19¼ gallons a head in the eight or ten hours, and 33⅓ gallons per head per day, when on constant service, and that we have given and continued the constant service, and reduced the consumption to 12·17 gallons per head per day, which is maintained without the slightest difficulty."

RESTORATION OF BATH ABBEY.

THE ninth annual meeting of the subscribers to the restoration of the Abbey Church of St. Peter and St. Paul, Bath, has just been held. The work has been carried out under the direction of Sir Gilbert Scott, and the rector has been a liberal contributor. The work was originally divided into three portions, the choir being used for divine worship while the nave was restored. The nave was first used for service in commemoration of the recovery of the Prince of Wales, and the whole church was first used for the inaugural service of the late Church Congress. The sum of 21,000*l.* has already been disbursed, and several thousands more are required to complete the work. The restoration has embraced the reparation of the exterior masonry and the roof; the strengthening of the foundations of the pillars in the nave, the substitution of a groined stone roof for a plaster one, the reseating with carved oak the whole area of the church, the providing at a cost of 800*l.* of a corporation pew, the removal of all tablets from the floor and fixing them on the walls, the removal of galleries in the choir, the substitution of an ornate pulpit for the old one, and a new system of lighting and heating. Mr. Murch, a Dissenter, undertook to collect funds for an east window, and has accomplished the work, and left a balance in hand.

ACCIDENTS.

Collapse of a Tunnel near Merthyr.—An accident has occurred in the tunnel between Merthyr Tydvil and Aberdare, on the Vale of Neath, Great Western Railway. This tunnel is about two miles in length. It passes through the mountain at an elevation of about 500 ft. from the bottom of the valley, and intersects many of the coal measures. Indeed, several years ago, the colliers working a neighbouring colliery had got under the tunnel in the excavations, and were so close to the roadway that they could hear the trains rolling over it distinctly. The excavations of coal have proceeded, and it is supposed the cavities thus formed have seriously interfered with the bed of the tunnel. A passenger train from Swansea to Merthyr had a very narrow escape. It passed in safety; but a goods train which followed it half an hour afterwards became blocked, and it was found that the tunnel had collapsed, the locomotive half burying itself in the *débris*. Although there were continual falls, the engineers cleared for a train, and the passengers were in their places awaiting the signal, when suddenly alarming news was received that nearly a hundred yards more of the tunnel had fallen in, and traffic could not be restored for several days. Meantime the traffic had to be carried over the Taff Railway to Quaker's-yard Junction.

Fall of a Mill-floor, near Holmfirth, during a Sale.—A serious accident has occurred at Bottoms Mill, near Holmfirth, where a sale of machinery and effects was taking place. As the sale was drawing to a close, the auctioneer entered the shoddy-room, at the end of the mill, in which were a pair of pattern-looms and a fearnought for sale. A number of persons pushed into the room, and some others were about to enter, when the floor gave way with a loud crash, and most of the occupants, together with the machinery, fell into the room underneath, a distance of about 10 ft. Many persons were injured.

Accident with Petroleum at Ulm.—A frightful accident has just occurred in the theatre of Ulm through the use of petroleum. Twenty-four lamps attached to the chandelier suspended to the ceiling of the house exploded while the performance was going on, and the flaming liquid fell in a shower on the spectators, amongst whom were a considerable number of ladies. In an instant the dresses of some twenty of them were in a blaze, and produced serious burns. One of the ladies expired a few hours afterwards.

MONUMENTAL.

The Prince Consort Memorial at Edinburgh.—The red granite pedestal, which forms no unimportant feature of this monument, will, the *Weekly Scotsman* anticipates, be generally recognised as probably the noblest piece of polished granite work in the kingdom. Messrs. Macdonald, Field, & Co., of the Aberdeen Granite Works, he says, had been preserving an enormous block,—the largest ever met with in their quarries,—in the expectation that it might be wanted to give due dignity to an important national work. When at length the order was given, the firm lost no time in proceeding to its execution. The working of three such heavy stones as form the upper portion of the pedestal,—weighing respectively 22, 20, and 18 tons,—has necessarily entailed much labour and anxiety. The following are the dimensions of the three upper stones:—

	Ft. In.		Ft. In.		Ft. In.
Cornice	12 1	×	6 10	×	2 2
Dado	10 1	×	4 10	×	4 4
Base	11 5	×	6 2	×	2 2

The pedestal was put up by Messrs. Beattie & Sons, with the assistance of Messrs. Macdonald & Co.'s foreman.

Oxford Diocesan Wilberforce Memorial.—The following statement has been issued by the Rev. J. H. Ashurst, of Waterstock Rectory, Oxon, the hon. secretary of the fund:—

"As I have been asked by several of the subscribers to the Oxford Diocesan Wilberforce Memorial to tell them how the work is progressing, I beg to inform you that at the end of the year 1873 the following amount had been promised:—For general purposes, 3,914*l.* 3*s.*; for statue, 128*l.* 3*s.*; for missionary studentship, 182*l.* 12*s.*; for endowment, 35*l.*: total, 4,259*l.* 18*s.* The committee have been obliged to abandon all idea of a statue, as the amount promised leaves no hope of their being able to carry out that part of the scheme in a satisfactory manner. They propose, however, in lieu of a statue, to erect a bishop's throne in Christ Church Cathedral, towards which upwards of 300*l.* have been already subscribed; if they could obtain about 700*l.* more, a handsome throne might be erected, bearing some inscription and carving to identify it with Bishop Wilberforce, which would form a suitable addition to the rest of the new work. The committee feel justified in beginning to build a chapel at Cuddesdon College, and hope to obtain the necessary plans and specifications from Mr. G. E. Street, the diocesan architect, as soon as he returns from the Continent. The committee are sorry that the scheme for a missionary studentship at Cuddesdon College has not been more liberally responded to. At least 2,500*l.* would be required to found one studentship of 100*l.* a year."

The Lancashire Statue Memorial of the late Lord Derby.—The balance-sheet and subscription-list of the Lancashire statue memorial of the late Lord Derby, erected in Miller Park, Preston, and unveiled on Whit-Tuesday last, shows that the total amount of subscriptions and bank interest was 2,574*l.* 10*s.* 8*d.*, and that the statue, pedestal, and erection cost 3,535*l.* 5*s.*; printing, advertising, and other expenses amounted to 36*l.* 11*s.* 8*d.*; leaving a balance remaining in the Manchester and County Bank of 2*l.* 14*s.* The subscription-list includes about 500 sums from the gentry and tradesmen of Lancashire, together with the penny subscriptions of 90,000 working men. The statue is the work of Mr. Noble, of London, and is considered a good likeness of the late earl. The prominent site selected for it makes the statue a conspicuous object to travellers entering Preston by rail from all parts of the South of England.

CHURCH-BUILDING NEWS.

Ramsgate.—The memorial stone of St. Paul's new Mission Church has been laid by the Bishop Suffragan of Dover. The locality in which the church is situated is that part of the town inhabited by a dense population of the poorer class,—near the top of King-street,—for whom a place of worship had been long felt to be a pressing want, which will now be supplied by the erection of this mission church. The architect of the new church (which will be 63 ft. long and 27 ft. wide) is Mr. R. Wheeler, of Tunbridge Wells, and the builders are Messrs. Smith & Son, of Ramsgate.

Barlavington.—Barlavington Church, situated at the foot of Barlton Down, has been reopened for divine service. The church itself is Early English, and consists of a nave and chancel, with side aisle. The whole fabric, at considerable cost, has undergone a reparation. The external walls have been cleaned and pointed, a south aisle entirely rebuilt, a new open roof added, nearly all the windows redressed with Pulborough stone, all quoins made good, a new chancel-arch built, the windows filled with cathedral tinted glass, a stone bell-gable erected, and the whole church repaved with Minton tiles. The cost of the work has been defrayed by voluntary contributions.

Chipping.—The Bishop of Manchester has reopened the ancient parish church of Chipping, which has, for a year and a half, been closed for restoration. Excepting the chancel, the whole of the church—comprising the nave, north and south aisles, and tower and south porch—has been restored by subscription, under the direction of Mr. Hibbert, of Preston. His report, which estimated necessary repairs at 1,500*l.*, was submitted to the landowners and parishioners, and the response was so good that not only were the authorities in a position to commission Mr. Hibbert to proceed with the work, but also to enlarge his original scheme so as to include the erection of a new vestry and the re-seating of the aisles, it having been before intended to fill them with the old oak benches, and only re-seat the nave. This increased the estimate to 1,800*l.*, which sum was promised before the commencement of the work. On the removal of the roof of the nave and north aisle, it was found that the timber was too far decayed to be put on again, and the leaning of the walls led to an examination of their foundations, which were discovered to be only 2 ft. deep, whereas interments had been made to the depth of 6 ft. close to them on both sides. A new roof and the rebuilding of the walls were now absolutely necessary, which further increased the cost to 2,500*l.* In the rebuilding, the church has lost none of its ancient character, the architect preserving the old features. The tower arch has been opened out, and the tower window now contributes to the improved appearance of the interior. This latter has been filled with stained glass, mainly by private subscription, by Forrest & Co., the subjects being coats of arms. The nave and north aisle have now open-timbered roofs of pitch pine, in keeping with the character of the building; and the oak roof of the south aisle has been cleaned. The windows are filled with diamond-shaped panes of cathedral-tinted glass. The roof is covered with Haslingden flag, and the walls externally have been cleared of whitewash, and pointed with cement. The contracts were let to the following:—Stonework, Messrs. Sparling & Lamb, Preston; woodwork, Messrs. Charnley, Coulthurst, Helme, & Howson, Chipping; plastering, Mr. Blake, Preston; slating, Messrs. Cooper & Fletcher, Chipping and Ribchester; plumbing, Mr. Dewhurst, Preston; heating, Mr. Seward, Preston; glazing, Mr. Walmsley, Preston. The lectern is of English oak, made by Mr. Tomlison, Preston.

Weston-super-Mare.—Loxton Church has been re-opened. The old pews have been removed, and open low benches substituted; also the flooring has been taken up and replaced with ornamental tile flooring. The old stone pulpit, supported on a corbel, carved in the form of a grotesque figure, had been moved at some time from its original position; the pulpit was therefore taken down, restored, and re-erected in a position nearer to the chancel screen. Illuminated texts have been employed as a decoration to the walls, and standards for candles are ranged down the central aisle. The work was executed by Mr. Samuel Harvey, contractor, of Weston-super-Mare, under the superintendence of Messrs. Ponton & Gouch, architects.

Poorstock.—West Milton Church has been consecrated. The new church is in the Early English style of architecture, and is built of native stone obtained at the local quarries of Nettlecombe. The dressings are of Bath stone. The edifice occupies a prominent position, commanding picturesque views of luxuriant dales. The structure comprises a nave, chancel, vestry, and baptistery; the external dimensions being,—nave, 55 ft. 6 in. long, 25 ft. 3 in. wide; chancel, 26 ft. 6 in. long, 20 ft. 9 in. wide; height from ground to eaves, 16 ft. 6 in. On the south side of the nave the church is entered by a porch, on the east side of which rises a tower about 30 ft. in height, and which is intended to receive, when the funds will allow the work to be done, a turret or spire. Bridgwater tiles cover all the roofs, the tiling formed in bands, alternately plain and

ornamental, with an ornamental tile cresting on the top, and four small Bath stone crosses on the main roof and porch. The floor is laid with encaustic tiles supplied by Messrs. Maw & Co. The whole of the plans for the structure were prepared by Mr. A. B. Hansford, son of Mr. Hansford, of Powerstock; and the carving was mainly done by Mr. B. Grassby, ecclesiastical sculptor, of Dorchester. The architectural advice of Mr. G. R. Crickmay, of Weymouth, was also obtained, and that gentleman presented the Portland stone steps.

Cleobury Mortimer.—The church has, for the last six weeks, been undergoing partial restoration. A chancel, 50 ft. long; a chantry, dedicated to St. Nicholas; a nave, a tower 100 ft. high, with north and south aisles of five bays, a southern porch, and a high spire of wood, form a specimen of the architecture of the early part of the fourteenth century. The parishioners have cleared the first bay of its pews from the northern to the southern end; they have laid the floor with encaustic tiles, scraped the arches and pillars, and, we believe, are about to replace the pews with open seats, when they can raise sufficient funds. A carved roof, of the fourteenth century, is hidden by a flat ceiling, and deal pews and a western gallery still disfigure the church.

Lewes.—The new cemetery for the united parishes of all Saints and St. Thomas-à-Becket-in-the-Cliff, has been consecrated by the bishop of the diocese. The new burial-ground is situated in the parish of St. Ann, and immediately adjoins the cemetery of St. Michael's. It contains about two acres, has been walled in, and laid out, with a broad winding path in the centre. The eastern portion is that which is consecrated for the interment of members of the Church of England. Near the lower end two mortuary chapels have been erected, from the designs of Mr. G. Fuller, architect, the builder being Mr. Punker, of the Cliffe. The chapels are similar, forming a Gothic structure of red brick, with stone facings, in the Early English style of architecture. They are connected by an arched covered entrance, surmounted by a turret.

Eighton Banks. — The church dedicated to St. Thomas at Eighton Banks has been enriched at various times, although it is situated in the midst of a poor population. Some four years ago, the wife of the respected vicar originated a scheme for decorating the interior. The first idea was to fill the east window with stained glass, which was duly accomplished. After a time a reredos, undertaken by Mrs. Atkinson, and painted by that lady, was placed in the church. Since then, the whole of the interior has been decorated, and now eight stained-glass windows have been erected. The choir have placed four of the windows containing the acts of mercy. The churchwardens have given another window, with the subject—"The Call of St. Peter." The next window, containing the release of St. Peter from prison, is the gift of working men; and the other two, "Eunice teaching Timothy," and "Raising the Widow's Son," the gift of the vicar and his wife.

Books Received.

The Maclise Portrait Gallery; with Notices chiefly by the late William Maginn, LL.D. Edited by WILLIAM BATES, B.A. London: Chatto & Windus, Successors to John Camden Hotten.

THE bringing together of the series of portraits of illustrious literary characters originally published in *Fraser's Magazine* between the years 1830 and 1838 was an excellent idea. Mr. William Bates, of Birmingham, suggested it in *Notes and Queries* in 1871, and the late enterprising Mr. Camden Hotten took up the suggestion, obtained Mr. Bates's co-operation, and proceeded to put it in execution. He was not permitted to see the publication of the volume, but his successors in Piccadilly have carried out the work to completion, and by this time have, we believe, nearly sold off the edition printed. It is a large, handsome, and most attractive volume, and leaves us but this one regret, that it was not made two, so that the additional notes by the editor might have been less "solid," and easier to read. It is almost impossible to review this book; it is so difficult to leave off reading it: to those who knew the men and women depicted it has a fascination that can scarcely be described. A large majority we ourselves knew; many of them intimately, and with warmest regard, and we could supplement with scores of notes the information, skit, and criticism here given. The group shown in the cartoon marked "A few of the F.S.A.s," including "Athenian Aberdeen," Sir Henry Ellis, Old Carlisle, Bowyer Nichols, the kindly-hearted Jerdan, Rosser, of the Byronic collar and Hessian boots; Crofton Croker; Caley; Hallam, of the "Middle Ages"; and some others, we have seen actually so placed, and in similar conclave, scores of times. All these have passed away without exception. Of the whole number of eminent persons illustrated by Maclise's rapid and truthful pencil (much more truthful, by the way, than the pen of Maginn, always prejudiced, and sometimes wicked), but very few remain. These include,—and long may we be able to say so,—Mrs. Norton, Mrs. S. C. Hall, D'Israeli, Thos. Carlyle, George Cruikshank, Harrison Ainsworth, and J. B. Buckstone.

We should not do justice if we omitted to say that Mr. Bates has done his part ably, and that the value of this most interesting series of pen and pencil sketches is much increased by the notices and observations contributed by him.

The printing of the book (by Messrs. Wyman) also deserves commendation.

Miscellanea.

Working Men's College.—At the winter *conversazione* of the members of this Institution, held at the College in Great Ormond-street, Mr. T. Hughes, M.P., the Principal of the College, addressed a few words of welcome to the guests of the evening, expressing his gratification and that of the council at the attendance of so many of the old friends and former students of the college, as well as of those who now constituted its *alumni*. That was a proof that the collegiate character of this Institution, which was always a part of its design, had been preserved. They had the pleasure of the presence of the heads of two corresponding associations—Mrs. Matheson, who conducted the newly-established Working Women's College, and who was endeavouring to set up a system of joint classes with this college; and also Dr. Christian, the head of the Ipswich Working Men's College, of the success of which it was sufficient to say that it numbered 1,100 members. He was glad to say that all the classes were in excellent working condition, and especially the art class, which was as advanced and steady in its development as when Mr. Ruskin, its first supervisor, left it. He had to announce that Mr. Lowes Dickenson had painted a portrait of the late and the first Principal of the College, the Rev. F. Maurice, which would be hung in a conspicuous position on its walls.

The Sewage Scheme at Buntingford.—A memorial having been presented to the Local Government Board from a large number of the rate-payers of Buntingford, against the adoption of the scheme of Messrs. Smith & Austin, about to be carried out by the Rural Sanitary Authority for draining the town, Mr. R. Rawlinson, C.E., C.B., the Government inspector, attended at the Board-room of the Rural Sanitary Authority, and made inquiries into the subject matter of the memorial, hearing all persons entitled to be heard upon it. Mr. Rawlinson visited the site of the proposed works, in company with the engineers and other gentlemen. The result of the inquiry will no doubt shortly be made known.

Railway Station Extension at Leeds.—The North-Eastern and the London and North-Western Companies are promoting a Bill, jointly, for the enlargement of their joint station at Leeds. It is proposed to extend it for about 1,698 ft. in one direction, and 225 ft. in another. It is also proposed to make a new approach to the station out of Boar-lane, and to stop up part of a small neighbouring street. Mr. T. E. Harrison, C.E., estimates the cost of the works at 209,351*l.* for the extension of the station, and 40,095*l.* for the new street, or a total of 249,446*l.* The two companies propose by the Bill to raise, each, 125,000*l.* in new share capital for the purposes of the Bill, and 41,000*l.* by loans.

The Walker Art Gallery, Liverpool.—It has been decided by the Liverpool Council that the New Art Gallery be called the "Walker Gallery," in honour of the present mayor, who has provided the funds for its erection, and that it shall be placed adjoining the Free Library and Museum.

Labourers' Cottages.—The Earl of Portsmouth has, in a letter to the *Times*, taken up the subject of labourers' cottages. His lordship admits that farmers in the South and West of England now find a difficulty in getting a sufficient supply of labour to cultivate their farms, and are beginning to put pressure on their landlords to provide comfortable cottages and gardens, so as to attract labourers to their employment. The remedy which Lord Portsmouth suggests is, that Government should advance loans to landlords at low interest. "Why not," he asks, "advance 100*l.* for every dwelling containing a minimum amount of space, with four rooms, and complying with certain sanitary requirements, built substantially of brick, stone, or concrete, to the satisfaction of the county surveyor, whose fee for inspection might be fixed by the magistrates at Quarter Sessions? Let it be a first charge on property, like a drainage loan, and the interest could be collected by the officers of the Inland Revenue." There can be no doubt, as Lord Portsmouth observes, that the question more particularly affects the small landowner, who has to meet the pressure with only small resources.

Lord George Manners's Partnership Farming. — It will be remembered that, more than a year ago, Mr. Brand, M.P. for Cambridgeshire, and Speaker of the House of Commons, proposed to the labourers on his estate in Sussex to become partners in his farming projects. Lord G. Manners, the brother to the Duke of Rutland, and senior member for the county, has, since Michaelmas, 1872, taken the labourers on his Ditton Lodge Farm *nolens volens* into partnership. Lord George does not expect his agricultural labourers to contribute anything during years in which he may farm at a loss, but he is satisfied with 5 per cent. interest on his capital, and 5 per cent. as profit, dividing the surplus amongst the labourers and himself in two equal proportions. The share of the labourers for the year ending Michaelmas last is 36*l.* 18s. 3d., which will be about 3*l.* a head. Lord George has paid his labourers their ordinary wages, the item for labour being 675*l.* 8s. 3d. His lordship anticipates that in an unfavourable year his loss will be nothing so great as it would be but for this arrangement.

Acts of Parliament and Contracts for Water.—The readers of the *Builder* may remember a paragraph in which a liberal-minded citizen of Bishop Auckland, feeling for the sufferings of the poor, offered to supply the town with good water for the next twenty-five years at an expense of 10,000*l.* to himself. The subject has again been brought forward before the Board of Health, and the clerk read the following legal opinion, "that, according to the 10th and 11th Vict. cap. 34, section 122, the Local Board could not contract with any person for water-supply for any longer term than three years; and by the Public Health Act, 1848, no contract could be entered into above 100*l.* without public notice inviting tenders. Mr. Duff's offer was for twenty-five years, and from the nature of it, it was quite clear that such a contract could not, from its extent, be entered into by the Board, however advantageous it would be to the district." This decision has finally put an end to the generous offer.

The London Gas Movement.—At the last week's meeting of the Metropolitan Board of Works Mr. Freeman introduced a numerous and influential deputation from the parishioners of Kensington, who presented a memorial protesting against the proposed increase in the price of gas by the Gas-light and Coke Company. Mr. Gordon, on behalf of the deputation, said prior to 1872 the district of Kensington was supplied by the Western Gas Company with 20-candle gas at 5s. per 1,000 ft. The company amalgamated with the Chartered Company. The effect of this amalgamation was that the company had given notice of its intention to raise the price of gas to 5s. 5d., and to supply 23-candle gas. The consumers did not want 23-candle gas. He contended that the company had an unnecessarily large capital, which they expended in a most reckless manner. He hoped the Board would use all its influence to prevent the proposed increase. The subject was referred to the Works Committee for report.

Sewage of Malvern.—The Board of Great Malvern have sought the advice of Mr. Bailey Denton upon the disposal of the sewage of that town.

Lambeth Palace. — The work of external restoration, to which we have before now alluded, approaches its completion. The whole of the brick and stonework of the "Lollard's Tower" has been externally renewed, the flooring has been repaired, and one or two rooms have been subdivided, in order to put it up for its present purpose; namely, as the town residence of the Bishop of Lichfield and of his brother, Canon Selwyn. The Morton Tower, or, as it was formerly and is often still called, the "Great Gate," is all but completed. The present gateway, which was built in A.D. 1490, by Cardinal Morton, is massive in size and of great strength, and resembles the entrance of a castle rather than an episcopal palace. The Archbishop allows the library to be open to students, and, indeed, to all respectable persons, on application, every Monday, Wednesday, and Friday in the year, vacations excepted.

St. Marie's Bells, Norfolk-row, Sheffield. A meeting of a committee appointed for raising subscriptions for these bells has been held at the Roman Catholic Association Rooms, Paradise-square, Canon Walshaw, R. C. rector of St. Marie's, presiding. Mr. Ellison stated that he had been asked by the Duke of Norfolk to request Mr. Hadfield, his Grace's architect, to obtain information as to the cost of the bells; and that in consequence Mr. Hadfield had, amongst other firms, applied to Messrs. Mears & Stainbank, who had supplied the large bell now in the tower; and that the cost of seven bells would be covered if a sum of 600*l.* were subscribed. Messrs. Hadfield & Son were instructed to obtain from Messrs. Mears & Stainbank estimates and full particulars, with the view of ordering, without delay, seven bronze bells, to complete a full peal of eight.

Building in Sunderland Park.—The following letter has been received from Alderman Reed by the Sunderland town council:—

"As a ratepayer and inhabitant of the borough of Sunderland I respectfully give you notice that in case you should proceed to erect on the Borough Park any buildings, to be used as a council chamber and offices, museum and library (as intimated by your advertisement dated the 18th day of November last, from plans, specifications, and estimates), or any building for any purpose whatever, I shall feel myself obliged, although very reluctantly, forthwith to adopt such legal proceedings as may be necessary to restrain you from doing so. The resolution of the council, dated the 4th day of March, 1863, shows that the ground referred to was purchased by the council, to be maintained, laid out, and planted as public walks and pleasure-grounds, as an addition to, and extension of, the (then) existing park, and for no other purpose, and the resolution of the council dated the 19th day of August, 1863, also shows that the sanction of the Home Secretary was given to the purchase of the ground for such purposes, and for such purposes only."

Winchester.—This ancient city, amongst other improvements, has had constructed, from the designs of Mr. T. Stopher, a shop for the sale of meat, which occupies the site of the old chemist's shop in the Piazza, premises dating as far back as the days of Queen Elizabeth, and which were worn out and untenantable. These have been removed, and replaced by a kind of Tudor house, which is far above the surrounding houses, in order to give height to the shop. The walls are covered with white glazed tiles, relieved with panels of chocolate, and similar coloured contrasts. The slabs are marble, and the front beneath them filled in with tiles, so that when the walls and slabs are cleansed the water will damage no paint. The builder was Mr. J. Crook, of Northam, Southampton.

A Workman Tanning his own Hide.—At the Gilesgate Tannery, last Saturday night, a man employed at the works, whilst proceeding, with the aid of a dim light from a horn lantern, down the tanyard, suddenly found himself tumbling in one of the pits, and lost his light. After wading about some time, he contrived to land, and made the best of his way to his own cottage. His extraordinary appearance startled his better-half, who failed to recognise William, her spouse. The tanner's skin is now stained a dark green morocco-colour, by his immersion in the warm liquor, and so strong is the tan, that in all probability the man will die a bookbinder's green.

Carlton Tower, Yorkshire. — Carlton Tower, the seat of Lord Beaumont, has been for some time past undergoing extensive alterations and additions. The old Stapleton Tower is just finished, and it is expected that a few months more will see the state apartments out of the builder's hands. Messrs. Haigh & Co., of Liverpool, are executing the work, under the direction of Mr. Welby Pugin. Mr. Seid is clerk of the works.

Bursting of a Reservoir at Festiniog.—On the 1st inst. there was an extraordinary heavy fall of rain, so that foaming torrents came down the mountain-sides. On the Dolwyddelan side of the Rhiwybryfdir quarries there were some large lakes, or reservoirs, artificially formed for the use of the machinery used at the quarries. In one of these—an immense reservoir—the water burst through the dam, carrying destruction in its wake. In some cottages, which were flooded, two children were drowned in their sleep. There were about thirty men working that night in a mine which was afterwards flooded, but owing to the presence of mind of a young man who ran there in time to warn them of the catastrophe, they were able to reach a place of safety, and in a few seconds afterwards the mine was flooded.

New Indian Museum and Library.—The Indian Museum, as now situated on the highest story of the India Office, has been found to be useless for all the purposes for which it was intended, and it has been resolved to erect on the plot of vacant ground in Charles-street, directly opposite the India Offices, and facing St. James's Park, a new museum and public library. To this building, which will be very handsome and commodious, all the treasures exhibited in the present museum, as well as those now stowed away for want of space, will be removed.

More Prizes for Art Students.—The Joiners', Carvers', and Ceilers' Company of the City of London have offered various prizes for competition amongst the students of the Schools of Art within the metropolitan area:—For building construction, one of 5*l.* 5*s.*, and a second of 3*l.* 3*s.*; for wood-carving, one of 5*l.* 5*s.*; for designs for carving, one of 3*l.* 3*s.*; and for designs for ceilings, frames, &c., one of 3*l.* 3*s.* The prizes are to be given in mathematical instruments, books, &c., to be selected by the successful competitors.

St. Matthew's Church, City-road, London. A chancel screen has been added to this church, from the design of Mr. Blashill, of Old Jewry-chambers. The plinth is of the blue Forest of Dean stone, upon which stands a moulded base of red Mansfield stone. The upper part is of Hopton Wood limestone pierced with moulded cinquefoil openings, and highly polished, so as to bring out its fine warm grey colour. Each half of the screen is formed of a single stone. The work has been executed by Messrs. Farmer & Brindley, of Westminster Bridge-road.

Iron Trade.—Messrs. W. Bird & Co., in their last report, say,—"As the result of the quarterly meeting is that there is no reduction in the price of Staffordshire manufactured iron, we have to advise the maintenance of present list prices. Manufacturers state that the inability to obtain ore, coke, or pig iron at reduced prices renders it impossible for them, now that old contracts have run out, to produce finished iron at a profit, and they are of opinion that any attempt to reduce wages would bring them into undesirable conflict with labour."

The Artisans and Labourers' Dwellings Association has been so successful that the directors have determined to issue all future shares at a premium. The shares are nominally 10*l.*, but after June 30th present subscribers will have to pay 10*l.* 5*s.*, and outsiders 10*l.* 10*s.* for them. The completion of the contracts on hand will involve a total cost of 250,000*l.*

The Institution of Civil Engineers.—The newly-elected president, Mr. Thomas Elliot Harrison, delivered an inaugural address on the evening of Tuesday, the 13th of January, 1874, at the house of the Institution, in Great George-street, on taking the chair for the first time after his election. We will return to it in our next.

Bow.—The congregation of the Presbyterian Church in the Mornington-road, Bow, having determined to erect a suitable permanent building, have appointed Mr. Peebles as their architect.

Roundhay Park, Leeds.—Two correspondents inquire what has been finally settled as to the plans for laying out this park. The authorities will perhaps inform us.

South Shields.—At the last meeting of the town council of this borough, held on the 7th inst., the salary of the borough surveyor (Mr. Manhurstall) was increased from 250*l.* to 300*l.* per annum.

TENDERS

For certain alterations and additions to Norfolk Hotel, Brighton. Messrs. Goulty & Gibbins, architects:—

Hollands (accepted)	£2,307 10 0

For decorations to Mitcham Hall, for Mr. S. Gedge. Messrs. Stevenson & Robson, architects. Quantities by Mr. G. D. Taaffe:—

Arnold	£1,205 0 0

For warehouses, St. Bride-street, for Mr. A. Clark. Mr. Albert Bridgman, architect:—

Bracher & Son (accepted)	£3,686 0 0

For alterations and repairs to, and partly rebuilding, "The Allsopp House," Tavern, and house adjoining the same, Marylebone-road, for Messrs. Combe & Co. Mr. Henry R. Cotton, architect. Quantities by Mr. A. J. Gate:—

Newman & Mann	£3,615 0 0
Foxley	3,589 0 0
M'Lachlan	3,357 0 0
Patrick	3,046 0 0
Toms	2,579 0 0

For fittings, &c., to "The Allsop House" Tavern, Marylebone-road, for Mr. Gascoyne. Mr. Henry R. Cotton, architect. Quantities by Mr. A. J. Gate:—

Foxley	£494 0 0
Patrick	484 0 0
M'Lachlan	465 0 0
Newman & Mann	443 0 0
Toms	373 0 0

For Infirmary, Greenwich. Mr. W. Wallen, architect. Quantities supplied by Messrs. Franklin & Andrews:—

Wilson	£34,976 0 0
Lonagan	34,778 0 0
Higgs & Hill	34,734 0 0
Boyce	34,635 0 0
Crockett	34,467 0 0
Smith	34,000 0 0
Perry, Bros.	33,900 0 0
Jenard	33,763 0 0
W. & F. Croaker	33,690 0 0
Wood	33,370 0 0
Downs & Co.	32,970 0 0
Hart	31,370 0 0

For alterations to 7, Little Tower-street. Mr. Theodore K. Green, architect:—

Browne & Robinson	£1,754 0 0
Newman & Mann	1,747 0 0
Simpson & Baker	1,689 0 0
Scrivener & White	1,590 0 0
Lawrence (accepted)	1,533 0 0

Accepted for two dwelling-houses, Victoria Park, Wavertree, near Liverpool, for Mr. William Dilworth. Mr. John E. Reeve, architect. Quantities supplied:—

Bricklayers' Work.

(Exclusive of grates and mantelpieces.)

Dilworth	£750 0 0

Masonry.

Crowther & Houghton	£230 0 0

Joinery.

Moore	£721 19 0

Slating and Plastering.

Fell, Parker, & Hunter	£230 0 0

Plumbing, Painting, and Glazing.

Smith	£224 0 0

For warehouse, shop, and dwelling-house, on the Holborn Viaduct, for Mr. Buck. Messrs. Tress & Innes, architects:—

Jackson & Shaw	£4,640 0 0
Bracher & Son	4,220 0 0
Brass	4,150 0 0
Conder	3,928 0 0
Wagstaff & Son	3,798 0 0

TO CORRESPONDENTS.

T. W. A. (just too late for what was wanted).—R. V.—H. L. P.—W. G. T.—X.—M. H. J.—C. H. L. W.—Bonding Courses.—Hoop Iron.—D. & Sons.—R. C.—G. L.—Mr. H.—W. F. C.—L. & B.—"Risum, &c."—J. E. R.—G. & G.—O. S.

We are compelled to decline pointing out books and giving addresses.

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

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